# SUPPLEMENT.


# The Mining Journal,

## RAILWAY AND COMMERCIAL GAZETTE:

**FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.**

[*The* MINING JOURNAL *is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.*]

No. 2529.—VOL. LIV. LONDON, SATURDAY, FEBRUARY 9, 1884. PRICE (WITH THE JOURNAL) SIXPENCE BY POST £1 4s. PER ANNUM.

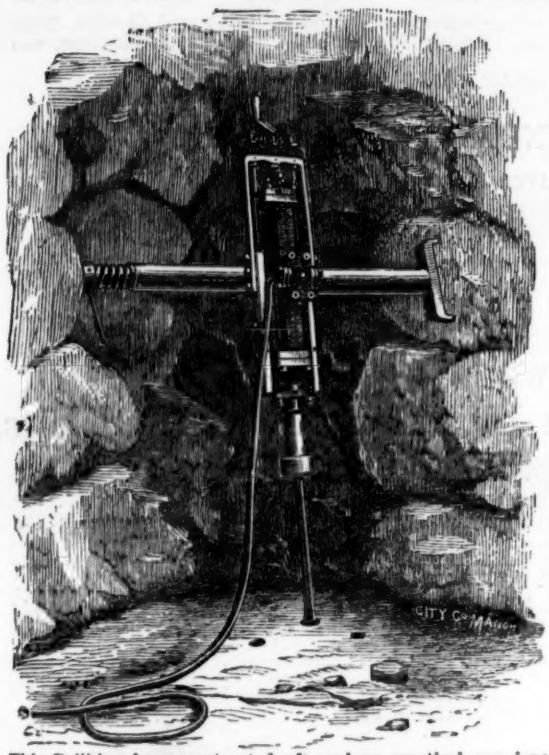


FIRST SILVER MEDAL, ROYAL CORNWALL POLYTECHNIC —Highest Award for Effectiveness in Boring, and Economy in the Consumption of Air

JUBILEE EXHIBITION, 1882.

THE PATENT

**"CORNISH" ROCK DRILL.**



This Drill has been constructed after a long practical experience in the requirements necessary for Mines, and has more than realised the expectations of its inventors. The chief objects in view were GREATER DURABILITY AND LESS LIABILITY TO DISARRANGEMENT; but it has also proved itself more EFFECTIVE AND ECONOMICAL.

We are now prepared to enter into any reasonable arrangement so as to enable users to judge of its merits, as we are thoroughly convinced that we can offer the BEST ROCK DRILL IN THE MARKET.

Further particulars on application to the Makers—

**HOLMAN BROTHERS,**
CAMBORNE FOUNDRY AND ENGINE WORKS,
CAMBORNE, CORNWALL.

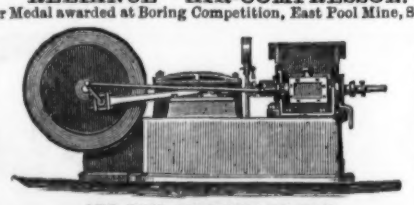
---

THE PATENT

**"ECLIPSE" ROCK-DRILL AND "RELIANCE AIR-COMPRESSOR."**

First Silver Medal awarded at Boring Competition, East Pool Mine, Sept. 1883.

PRIZE MEDAL, HIGHEST AWARD.



PARIS EXHIBITION. 1878.

ARE NOW SUPPLIED TO THE
ENGLISH, FOREIGN, AND COLONIAL GOVERNMENTS
And are also in use in a number of the
LARGEST MINES. RAILWAYS, QUARRIES, AND HARBOUR WORKS IN GREAT BRITAIN AND ABROAD
FOR ILLUSTRATED CATALOGUE AND PRICES apply to—
**HATHORN & CO., 22, Charing Cross, London, S.W.**

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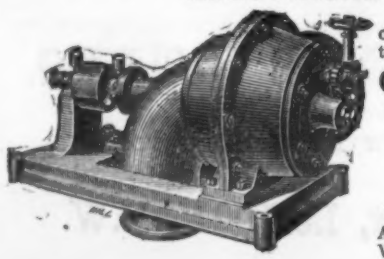
# WATER POWER,

UTILISED WITH THE GREATEST ECONOMY AND EFFECT BY THE PATENT "TRENT" TURBINE.

As arranged, with a horizontal spindle, it is specially adapted for MINING PURPOSES.



Catalogues on application to the sole British Maker,

**C. L. HETT,**
ANCHOLME FOUNDRY,
BRIGG,
ENGLAND.

The Patent Trent, New American Hercules, & Victor Turbines.

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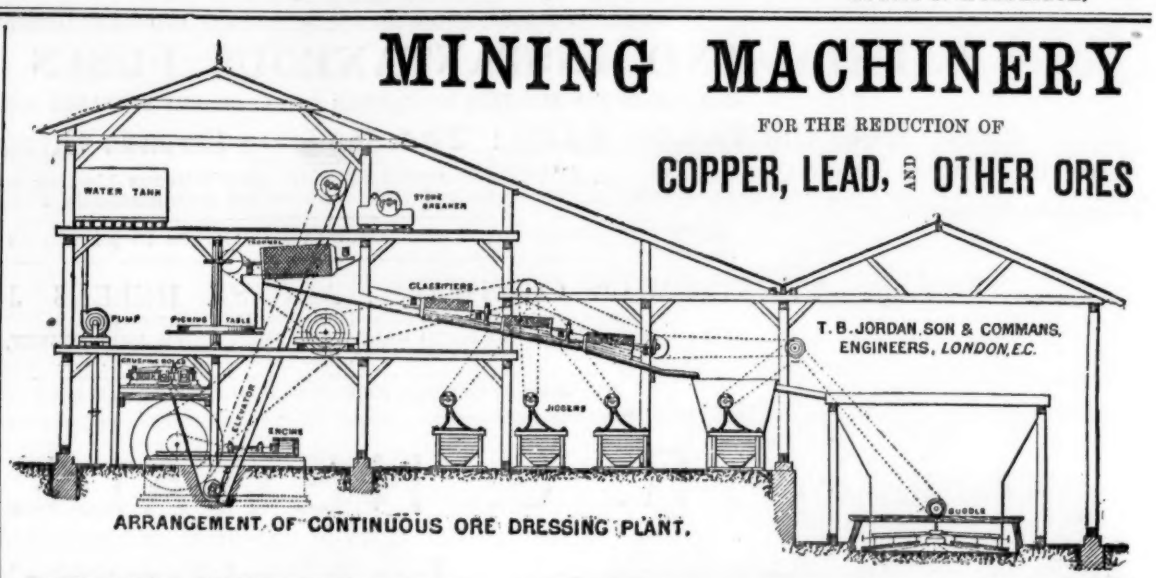
# MINING MACHINERY

FOR THE REDUCTION OF

**COPPER, LEAD, AND OTHER ORES**




ARRANGEMENT OF CONTINUOUS ORE DRESSING PLANT.

JORDAN'S IMPROVED GOLD AND SILVER REDUCING MACHINERY, PATENT PULVERIZERS, AND ROCK DRILLING PLANT, &c., &c.

**T. B. JORDAN, SON, and COMMANS, 52, Gracechurch St., London, E.C.**

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PATENT

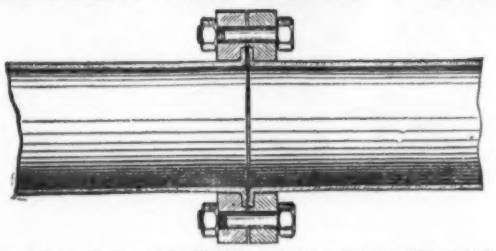
**"INGERSOLL ROCK DRILL."**

MEDAL AND HIGHEST AWARDS.

1872—American Institute.
1873—Ditto.
1874 — London International.
1875—Manchester.
1875—Leeds.
1875—Cornwall.
1875—Rio de Janeiro.
1876—Australia.
1876—Philadelphia.
1877—Cornwall.
1877—Mining Institute.
1878—Paris.

We claim 40 per cent. greater effective drilling power.

**WROUGHT-IRON STEAM TUBES.**



TUBES FOR BOILERS, PERKINS'S, and other HOT-WATER SYSTEMS.

For Catalogues of Rock Drills, Air Compressors, Steel or Iron Steam Tubing, Boiler Tubes, Perkins's Tubes, Pneumatic Tubes, and all kinds of Machinery and MINING PLANT, apply to—

**LE GROS, MAYNE, LEAVER, & CO.**
60, Queen Victoria Street, London, E.C.

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**SPECIAL.**

# PULLEY BLOCKS AND BRASS FERRULES

ALL KINDS.

HOME AND EXPORT. CHEAPEST AND WARRANTED.

SEND FOR PRICES.

**GRIMSHAW & CO.,**
Mechanical Engineers, Brass Ferrule Makers, &c.,
ACCRINGTON, LANCASHIRE.

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THE

# "Barrow" Rock Drill

COMPANY.

HOSKING AND BLACKWELL'S PATENT.

SUPPLY their CELEBRATED ROCK DRILLS, AIR COMPRESSORS, &c., and all NECESSARY APPLIANCES for working the said Drills.

The DRILLS are exceedingly STRONG, LIGHT, SIMPLE, and adapted for ends stopes, quarries, and the sinking of shafts. They can be worked by any miner

Their DRILLS have most satisfactorily stood the TEST of LONG and CONTINUOUS WORK in the HARDEST KNOWN ROCK in numerous mines in Great Britain and other countries clearly proving their DURABILITY and POWER.

About 200 are now at work driving from three to six times the speed of hand labour, and at from 20 to 30 per cent. less cost per fathom. They can be worked by any miner.

For PRICES, Particulars and Reports of Successful and Economical Working, apply to—

**LOAM AND SON,**
LISKEARD, CORNWALL.

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THE PATENT

# "Cranston" Rock Drill,

AIR COMPRESSOR, AND DEEP BORING MACHINERY.

For prices, and particulars of rapid and economical work accomplished, apply to

**J. G. CRANSTON,**
22, GREY STREET NEWCASTLE-ON-TYNE.

FIRST AWARD.
SYDNEY. 1879.

BICKFORD'S PATENT FUSES

FIRST AWARD.
MELBOURNE, 1881.

SILVER MEDAL OF THE MINING INSTITUTE OF CORNWALL, TRURO, 1880, for an Improved Method of Simultaneous Blasting.

OR SIMULTANEOUS BLASTING.

# BICKFORD, SMITH AND CO.,

THE INVENTORS, AND ORIGINAL PATENTEES AND MANUFACTURERS OF

## SAFETY AND INSTANTANEOUS FUSES AND IGNITERS

FOR USE IN ALL BLASTING OPERATIONS AND SPECIALLY PREPARED FOR ANY CLIMATE

**Note the TRADE MARK: Two Separate threads through centre of Fuse.**

BICKFORD, SMITH AND CO.'S Patent Igniters and Instantaneous Fuses for simultaneous blasting are being extensively used at home and abroad. This improved method is the cheapest, simplest, and most dependable ever introduced for simultaneously firing any number of charges. For full particulars, see Descriptive Catalogue.

PRICE LISTS, DESCRIPTIVE CATALOGUES, AND SAMPLES TO BE HAD ON APPLICATION.

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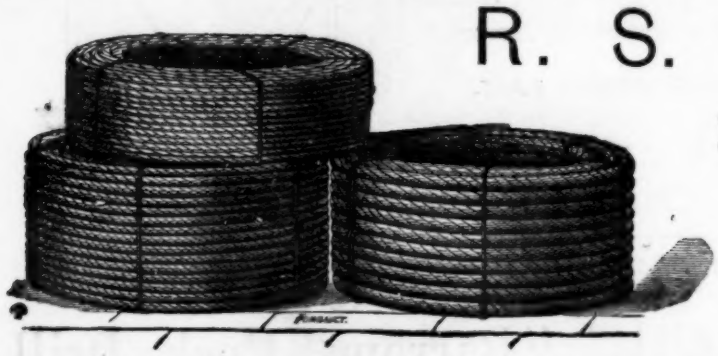
HEAD OFFICE—TUCKINGMILL, CORNWALL.
LANCASHIRE OFFICE—ADELPHI BANK CHAMBERS, SOUTH JOHN STREET, LIVERPOOL.
LONDON OFFICE—85, GRACECHURCH STREET, E.C.

Every package bears Bickford, Smith, and Co.'s copyright label.



# R. S. NEWALL AND CO.,

Sole Patentees of Untwisted Wire Rope.

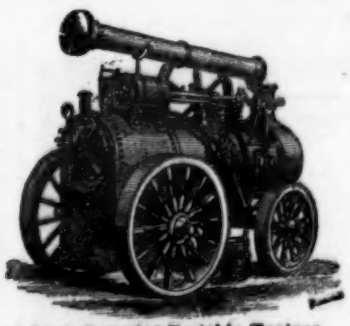
**Iron & Steel Ropes of the highest quality for Collieries, Railways, Suspension Bridges, &c.**

PATENT STEEL FLEXIBLE ROPES AND HAWSERS.
IRON STEEL, AND COPPER CORDS. LIGHTNING CONDUCTORS.
COPPER CABLES of high Conductivity for Electric Light and Power.

London: 130, STRAND, W.C. Liverpool: 7, NEW QUAY.
Glasgow: 68, ANDERSTON QUAY.
MANUFACTORY: GATESHEAD-ON-TYNE.

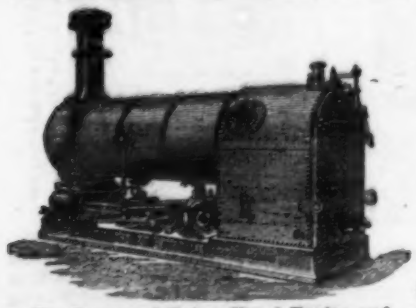
NOTICE TO COLLIERY PROPRIETORS, MINE OWNERS, &c.

**The PATENT "ROBEY" MINING ENGINE is complete in itself, ready for putting down and setting to work, either as a Permanent or Temporary Winding or Pumping Engine.**

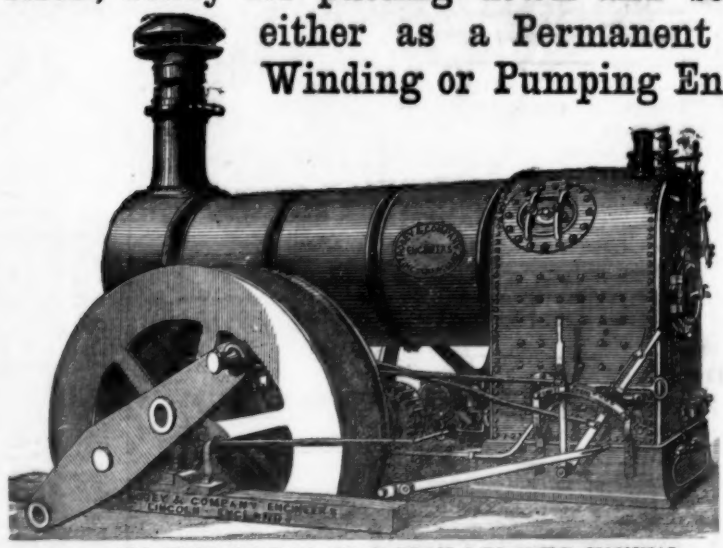


Robey's Superior Portable Engines, 4 to 50-h.p.

LONDON OFFICES:—
**117, Cannon Street, E.C.**



The Improved Robey Fixed Engine and Locomotive Boiler Combined, 4 to 65-h.p.

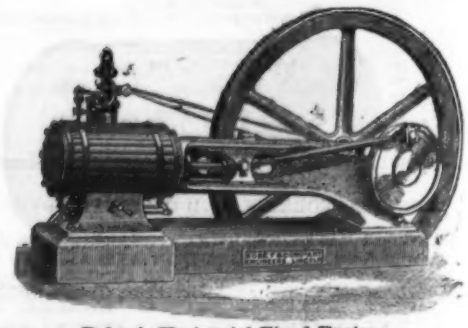


ALL SIZES KEPT IN STOCK FROM 6 TO 50-H.P. NOMINAL.

Please note this is the Original "ROBEY" Engine as designed and manufactured by Messrs. ROBEY and Co., of Lincoln. All others are mere attempts at imitation.

For particulars and prices apply to the Patentees and Sole Manufacturers—

Robey's Vertical Stationary Steam Engine, 1½ to 16-h.p.



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# ROBEY & CO., ENGINEERS, LINCOLN.

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ASBESTOS FIRE AND ACID-RESISTING PAINT,
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ASBESTOS MILLBOARD JOINTING
ASBESTOS BOILER COVERING
ASBESTOS CEMENT,
ARE UNRIVALLED.

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The Only Good Belt made of Textile Fabric.—Manufactured solely from the best Russian Flax.

SPECIALITY FOR DYNAMOS, SAW MILLS, AND MAIN DRIVING PURPOSES.

Price List and Particulars from—

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# R. HUDSON'S

## Patent Steel Trucks, Points and Crossings,

## PORTABLE RAILWAY, STEEL BUCKETS, &c., &c.

**Telephone No. 14.**
*In connection with the Leeds Exchange, and all the principal Hotels and places of business in the town.*

## GILDERSOME FOUNDRY, NEAR LEEDS.

(Near Gildersome Station, G.N.R. Main Line, Bradford to Wakefield and London, via Laisterdyke and Ardsley Junctions.)

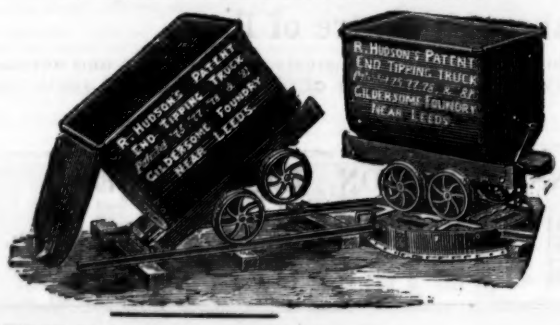
**Registered Telegraphic Address:—"GILDERSOME, LEEDS."**

UPWARDS of 25,000 of these Trucks and Wagons have been supplied to the South African Diamond Mines; American, Spanish, Indian, and Welsh Gold, Silver, Copper, and Lead Mines; Indian and Brazilian Railways, and to Railway Contractors, Chemical Works, Brick Works, and Coal and Mineral Shippers, &c., &c., and can be made to lift off the underwork, to let down into the hold of a vessel, and easily replaced. They are also largely used in the Coal and other Mines in this country, and are the LIGHTEST, STRONGEST, and most CAPACIOUS made, infinitely stronger and lighter than wooden ones, and are all fitted with R. H.'s Patent "Rim" round top of wagons, requiring no rivets, and giving immense strength and rigidity. End and body plates are also joined on R. H.'s patent method, dispensing with angle-irons or corner plates.

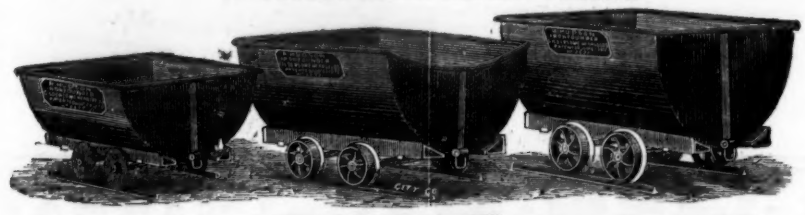
**Patented in Europe, America, Australia, India, and British South Africa, 1875, 1877, 1878, 1881, and 1883.**
**N.B:—The American, Australian, Indian, and Spanish Patents on Sale.**

## CAN BE MADE TO ANY SIZE, AND TO ANY GAUGE OF RAILS.

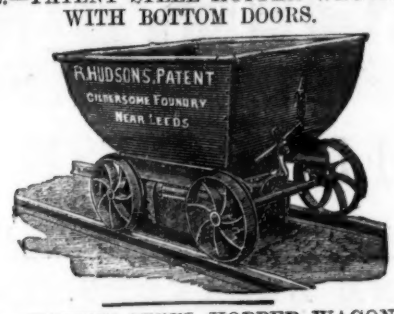
1.—PATENT STEEL END TIP WAGONS.


R. HUDSON'S PATENT END TIPPING TRUCK
GILDERSOME FOUNDRY NEAR LEEDS
R. HUDSON'S PATENT END TIPPING TRUCK
GILDERSOME FOUNDRY NEAR LEEDS

7.—PATENT STEEL MINING WAGONS.

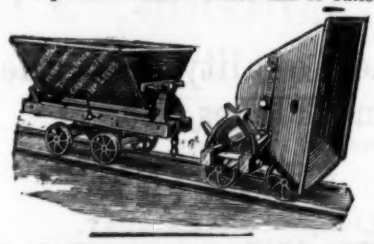


12.—PATENT STEEL HOPPER WAGON, WITH BOTTOM DOORS.

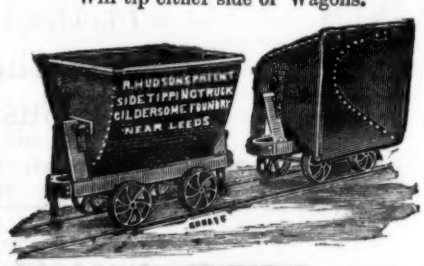



13.—PATENT STEEL HOPPER WAGON.

2. PATENT UNIVERSAL TRIPLE-CENTRE STEEL TIPPING TRUCK,
Will tip either SIDE or either END of rails.

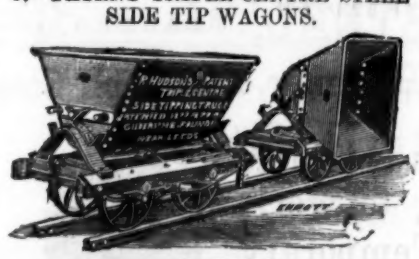


8.—PATENT DOUBLE-CENTRE STEEL SIDE TIP WAGONS,
Will tip either side of Wagons.

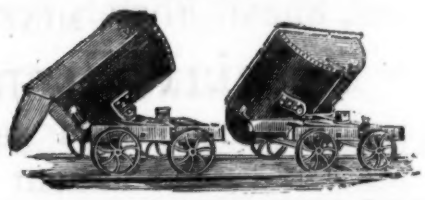



One man can EASILY tip ANY WEIGHT in these wagons.

3.—PATENT TRIPLE-CENTRE STEEL SIDE TIP WAGONS.

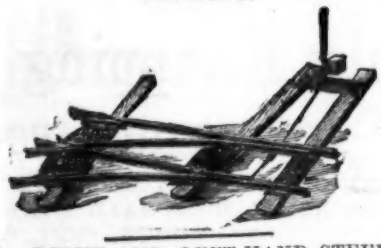


9.—PATENT STEEL ALL-ROUND TIP WAGON.



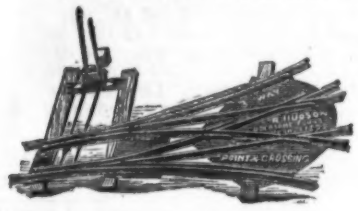
4. -PATENT STEEL PLATFORM OR SUGAR CANE WAGON.

10.—LEFT-HAND STEEL POINT AND CROSSING.



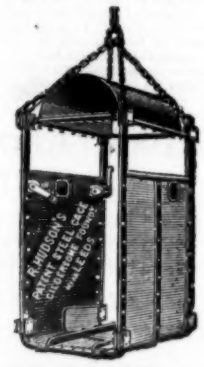
5.—PATENT STEEL CASK.
As supplied to H.M. War Office for the late war in Egypt).
DOUBLE the STRENGTH of ordinary Casks without any INCREASE in weight.
(Made from 10 gals. capacity UPWARDS to any desired size.)

11.—RIGHT AND LEFT-HAND STEEL POINT AND CROSSING.

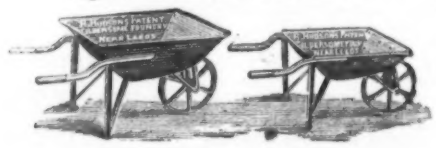


14.—SELF-RIGHTING STEEL TIP BUCKET.
(The "CATCH" can also be made SELF ACTING if desired.)

15.—STEEL CAGE.

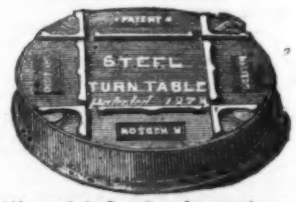



16.—PATENT STEEL WHEELBARROWS.
Made to any Size.
Lightest and Strongest in the Market.



A great success.

17.—STEEL SELF-CONTAINED TURNTABLE.



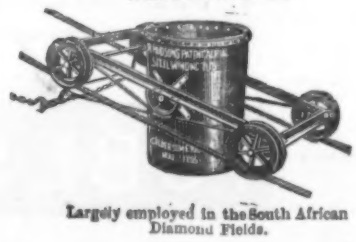

(Also made in CAST IRON for use where weight is not a consideration.

No. 10.—PATENT STEEL CHARGING BARROW,
DOUBLE the STRENGTH & much LIGHTER than ordinary Barrows

6.—ROBERT HUDSON'S
PATENT IMPROVED IRON SMITH'S HEARTH,
NO BRICKWORK REQUIRED.
A Special quality made almost entirely in STEEL, effecting a GREAT SAVING IN WEIGHT.

Large numbers in use by all the principal Engineers in this country and abroad.

18.—"AERIAL" STEEL WINDING TUB.

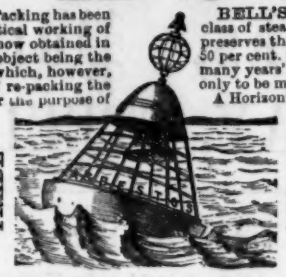


Largely employed in the South African Diamond Fields.

## ALL KINDS OF BOLTS NUTS, AND RIVETS MADE TO ORDER ON THE PREMISES

# BELL'S ASBESTOS.

**BELL'S PATENT ASBESTOS BLOCK PACKING,** for High Pressure Engines. This Packing has been specially designed to overcome the difficulties experienced by engineers and others in the practical working of engines of the most modern type of construction. The greatly increased skill and workmanship now obtained in the construction of engines and boilers have led to a rapid increase in the working pressure, the object being the attainment of a high rate of speed combined with economical working, the practical advantage of which, however, cannot be realised unless the Packings are so constructed as to avoid stoppages for the purpose of re-packing the stuffing boxes. It is now a recognised fact that the most perfect heat-resisting material suitable for the purpose of a Packing is Asbestos, but to ensure a successful application of this fibre, great skill is required in manufacture. In this Packing the Asbestos is woven into a stout cloth, and owing to the peculiar way in which it is manipulated, great elasticity is imparted to the Packing. This Packing has met with the most unqualified approval wherever it has been used, and on being taken out after about twelve months, working at 70 lb. pressure, it has been found to be in a perfect state of preservation, and was therefore replaced. The Patent Block Packing is square, as Fig. 1, and Figs. 2 and 3 represent the Round Block Packing with solid and hollow rubber core, and Fig. 4 without core, but with rubber inlaid. An Engineer writes as follows:—"The Asbestos Block Packing works splendidly. I have never seen its equal. We keep our gland nuts so that you can move them with finger and thumb, and can maintain a constant vacuum of 28½ in." As these packings are extensively imitated, and as it is a common practice among dealers and agents to supply the cheaper manufactures at my list prices, users are requested to see that the packing supplied to them bears my trade mark.



TRADE MARK.

The goods of this house are of the highest quality only, and no attempt is made to compete with other manufacturers by the supply of inferior materials at low prices. All orders must be sent direct to the undermentioned depôts and not through Agents or Factors.

**BELL'S ASBESTOS BOILER PRESERVATIVE.** This useful mixture by absorbing the free oxygen that is in the water entirely checks pitting and corrosion. It also disintegrates incrustation so immediately as to prevent its adhering to the plates. Not only is a great economy of fuel effected by keeping boilers clean, but the risk of having the plates burned is thereby obviated. It has been computed that ⅛₂ in. thick of incrustation causes a waste of 15 per cent. of coal; ¼ in., 60 per cent.; ½ in., 150 per cent. Thus the Preservative avoids the great risks which are inseparable from scaled plates, lengthens the life of a boiler, and covers its own cost a hundred-fold by economy of fuel. It is entirely harmless, and has no injurious action on metals. It can be put into the feed tank or boiler, as may be most convenient. Sold in drums and casks bearing the Trade Mark, without which none is genuine.

**BELL'S ASBESTOS YARN and SOAPSTONE PACKING**

for Locomotives, and all Stationary Engines running at very high speed with intense friction.

The following Testimonial refers to this Packing:—

Festiniog Railway, Locomotive Superintendent's Office,
Portmadoc, January 13, 1883.

Mr. John Bell, 118, Southwark-street, S.E.

DEAR SIR,

I have much pleasure in saying that the Asbestos Yarn and Soapstone Packing gives every satisfaction; indeed, better than we expected. We have a locomotive packed with it, which has been running five months (and think of the piston speed with our small wheels). I think the Soapstone a great improvement, as it keeps the packing elastic, and prevents it getting hard. I am very pleased with its working, and also the very low price for such good lasting Packing. The Asbestos Yarn we find is very useful, and answers admirably. Yours truly,

(Signed) W. WILLIAMS.

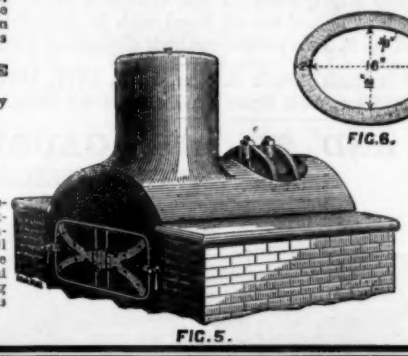


FIG. 5.

FIG. 6.

FIG. 1.

FIG. 2.

FIG. 4.

FIG. 3.

**BELL'S ASBESTOS and INDIA-RUBBER WOVEN TAPE and SHEETING,** for making every class of Steam and Water Joints. It can be bent by hand to the form required without puckering, and is especially useful in making joints of manhole and mudhole doors; also for large "still" joints where boiling fat and steam have to be resisted. It is kept in stock in rolls of 100 ft., from ⅛ in. (Fig. 6) to 3 in. wide, and any thickness from ⅛₂ in. upwards. Manhole covers can be lifted many times before the renewal of the jointing material is necessary. The same material is made up into sheets about 40 in. square, and each sheet bears the Trade Mark, without which none is genuine. It is very necessary to guard against imitations of this useful material, and to secure themselves against being supplied with these inferior articles at my price, users are recommended to see that every 10 ft. length of the Asbestos Tape purchased by them bears the Trade Mark.

**BELL'S SPECIAL LONDON-MADE ASBESTOS MILLBOARD,** for Dry Steam Joints, made of the best Asbestos fibre, is well-known for its toughness and purity, and is absolutely free from the injurious ingredients frequently used to attain an appearance of finish, regardless of the real utility of the material. Made in sheets measuring about 40 in. square, from 1-64th in. to 1 in., and ½ millimetre to 25 millimetres thick. Each sheet bears the Trade Mark.

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This material is admirably suited to steam pipe joints and every class of valve.

Valves made of this material are very durable, as they are not subject to injury by oil.

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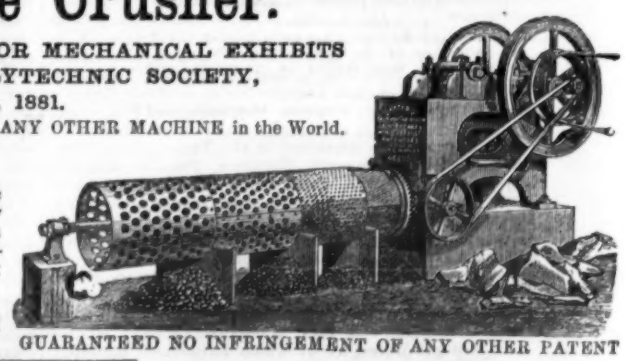

To Mr Baxter, Leeds. *Cinderford, Feb.* 13, 1883.

DEAR SIR,—I am pleased to be able to tell you that the Machine works splendidly. We are breaking 16 trucks a day now, and we thought it a good day's work to do 10 a day with the old Machine, so you can see the difference. I had a gentleman looking at it yesterday, and he was surprised to see it work so easily. Yours truly, E. ORGAN.

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SILVER MEDAL (HIGHEST AWARD) MELBOURNE, 1881

## TUBES

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## Original Correspondence.

### OPHIR AND RUSH VALLEY MINING DISTRICTS—No. III.

#### UINTAH MINING DISTRICT.

SIR,—Uintah (Parley's Park) mining district begins about 30 miles east-south-east of Salt Lake City, and adjoins Big Cottonwood on the north and north-east sides. The general geological structure is quartzite and calcareous shale of the carboniferous age, and in all probability overlying the granite, which appears in the southern and south-eastern part of the district. The veins appear, first, as true fissure veins cutting through the strata; second, as bed or strata veins, in limestone lying between the strata, and conforming to the course, dip, foldings, and dislocations of the same. The gangue or vein material consists of brecciated material from the enclosing wall rocks, together with quartz and earthy infiltrations, and other silicious material as a result from aforesaid infiltrations. The ore in most of the mines is milling ore. There are, however, in the west and north-west part of the district large bodies of carbonate of lead and galena ores. The milling ore appears as chlorite, sulphides, and native silver.

The leading mines of this district are:—The Ontario Silver Mining Company's mines, consisting of the Ontario, Banner, Last Chance, Switzerland, Henrietta, Eudora, Saw Mill, Great Eastern, Orient, Occident, Union Tunnel Mines, and the great Ontario new tunnel for the development of all of the Ontario Company's property. The Ontario mother lode is a true fissure vein in quartzite, connected with large extensive porphyry dykes. These dykes have fissured the country rock in every direction to such an extent, that many, yes, almost all, from the Ontario radiating mines, flatter themselves with the idea that all of them work on the Ontario lode or fissure. This vein has been explored to a depth of 1000 ft., and to a considerable distance east and westerly on the strike by eight levels running parallel at a perpendicular distance of 100 ft. from each other. The mine or mines of the Ontario Company are worked by a force of 330 men. Attached to the mine is a saw-mill and a 40-stamp mill. The 40-stamp mill has a 250-horse power steam-engine with four boilers to supply the motive power; 80 men are employed at the mill. Attached to the mill is a No. 1 Stetefeldt furnace, dust chamber, a battery for crushing salt, and all necessary appliances to make it first class in every sense.

The Ontario is stocked for $10,000,000. The mine is at present drained through a tunnel 5763 ft. long, which said tunnel tops the mine on the 600 ft. level at shaft No. 3. The dimensions of the building attached to shaft No. 3 are as follows:—Hoisting engine-room, 140 × 40 ft.; pump engine-room, 58 × 48 ft.; boiler-room, 82 × 41 ft.; carpenters' shop, 64 × 46 ft.; blacksmiths' shop, 40 × 32 ft.; coal-house, 65 × 42 ft. (the coal-house is capable of holding 1000 tons of coal); the car-house is 42 × 16 ft.; water tank-house, 32 × 22 ft.; boiler tank, 32 × 16 ft.; another water tank-house, 35 × 22 ft. In the boiler-room are eight boilers. The hoisting-engines are of the best, and able to work the shaft to a depth of 2500 ft. No. 3 shaft is divided into two compartments of 4½ × 5 ft. for hoisting, and a 7 × 9 ft. pumping compartment. There is a double engine geared for the pump, handling, if necessary, 15 tons at a lift. The pumping machinery consists of a high-pressure cylinder, 42 in. in diameter, 10 ft. stroke; one low-pressure cylinder, 72 in. in diameter and 10 ft. stroke. The engine is able to work a double line of 20-in. pumps to a depth of 2000 ft., and is set upon a foundation of over 7000 tons of quarried and cut stone. On the 800 ft. level is stationed a pump which throws 26,000 gallons of water to the 600 feet or tunnel level. The Ontario tunnel, from its mouth to the shaft, is 5 ft. by 7 ft. in the clear, exclusive of flume on the floor, 18 in. deep by 3 ft. wide. The grade is ½ in. to the rod, or 13·4 ft. per mile. The 600 ft. level has been run 800 ft. east and 1400 ft. west on the vein, which is here from 8 to 10 ft. wide. The distance from shaft No. 2 to shaft No. 3 is 1150 ft. on the vein. The ground owned by the Ontario Silver Mining Company, and containing the Ontario vein, as traced, is 1 mile long. This magnificent vein has produced to the owners of the Ontario up to Jan. 1, 1884, over $13,000,000. From this has been paid, in 90 dividends, the sum of $5,150,000. Next to the Ontario, working on the same vein, is the McHenry Mine, owned by the Nederland Maatschoppy tot Exploitatie van Silver Mijnen, head-quarters at Amsterdam, in Holland. Attached to the McHenry Mine is a 20-stamp mill.

The Flagstaff, owned by a Michigan company, is extensively developed. Attached to this mine is the Marsac 30 stamp mill; the mill contains a dry crusher, a 150-horse power steam-engine, ten pans, five settlers. A 60-inch Howell rotary roaster has a capacity of roasting 40 tons of ore per day. The mill works at present the ores of the mines of the Crescent Mining Company, under the able management of Mr. E. P. Ferry. The mines of the Crescent Mining Company consist of the Pinyon and Pinyon Extension, Rebellion, Mulkany, Shamus O'Brien, Hecla, Ætna, Tidal Wave, Climax, Senator, James A. Garfield, Bible Back, Samuel, Fallon, and other mines. These mines are developed by the lower tunnel, 1200 ft. long; Rebellion discovery tunnel, 850 ft.; California tunnel, 450 ft.; Snowdrift tunnel, 450 ft., Cabin tunnel, 300 ft.; Climax tunnel, 1200 ft.; Pinyon main tunnel, 450 ft.; Bible Back tunnel, 150 ft.; Nos. 1, 2, 3, and 4 tunnels, from 50 to 100 ft. each. The Buckeye and Walker Mines, working on the same ore body as the Crescent, are developed by the Walker and Walker tunnel, 700 feet long, and by the Walker and Buckeye tunnel, 900 ft. long. The above said mines of the Crescent and Walker and Buckeye Companies are developed by the aforesaid tunnels and 20,000 ft. in length of drifts, levels, shafts, and inclines, to a depth of 360 ft. The ore deposit is a so-called blanket vein 15 to 20 ft. wide, dipping at an angle of inclination of 18° north-westerly. The force at work at the Crescent Company's mines consist of 60 men, producing at an average 40 tons per day. The total production up to Jan. 1, 1844, is 13,000 tons of ore, sold at $35 per ton, from which $150,000 has been paid in dividends. E. P. Ferry is also the owner of the Arms, Boss, Chandler, Champion, Dark Horse, Huron, Ida Bell, Illinois, Journal, Jeremiah, Jeanette, Lincoln, Nero, Ruby, Ravine, San Joaquin, Stoke, Superior, Thayne, Tip Top, Tenderfoot, Triangle, Virginia, Woodside, and Wolverine, all of which mines are in a very advanced state of development.

R. C. Chambers owns and is interested in the Annex, Almy, Central, Centennial, Custer, Dreadnaught, Fountain, Frontier, Goodall, Keno, Kervin, May, May Flower, Mountain Chief, Mazeppa, Mathew, Narrow Gauge, Ohio, Olive Branch, Province, Sheridan, Romany, Roamer, Remnant, Trump, Tiger, Three Play, Union, Yawp, and other mines, all of which property is in an advanced state of development, as may be expected from the enterprising manager.

The Apex Mining Company's property is situated south of the Crescent property, in Thayne's canyon, and consist of the Antelope, Brave Columbia, Buckeye Extension, Cumberland, Constitution, Daylight, Gazelle, Hannah, Jim Fisk, Kangaroo, Leopard, Monroe Doctrine, and Missouri Mines, all of which have been patented. There is every reason to consider the above-said property a very valuable one, being on the same ore body as the Crescent and Walker and Buckeye property.

Parley's Park, situated east of the Ontario, includes Parley's Park Lake, owned by the Standard Oil Company. The developments consist mainly in a shaft 900 ft. deep, which shaft crosses the vein at the 500 ft. level. The shaft has two compartments, with extensive hoisting works attached. Barrio's Company property is well developed, showing good ore.

Daily Group, situated in Empire Gulch, consists of 26 patented and 36 unpatented claims, considered to be on the Ontario fissure, two tunnels have been run to tap the vein with satisfactory results. Hoisting works, capable to sink the shaft to a depth of 1000 ft., have just been completed. The property is to be worked on the same principle as the Ontario.

Black Diamond, owned by Schupbach and Abegglan Brothers; good ore, developments advancing.

Silver Key Company owns the Silver Key, Tiger, Dr. Smith, and other mines; a good property, and well managed. A tunnel 600 ft. long has crossed several veins of very good ore. The face of the tunnel is 300 ft. below the surface; incline on vein 100 ft. below tunnel level.

Putnam group, situated in the quartzite formation, parallel to the Ontario group. White Pine group have steam hoisting and pumping machinery. The property is well developed, and are producing. Roaring Lion, situated on Rebellion Hill, owned by Sam Levy and Co., of Salt Lake City. A tunnel for the opening of the vein is pushed constantly ahead. Character of the ore the same as in the Crescent Mines.

Uintah Company owns the Aurora, Black Hawk, Black Bear, Disappointment, Empire, Hope, Intervention, and other mines, developed principally by two tunnels, one at the base of the hill and the other 250 ft. above.

Barry Consolidated Consists of nine mines; considerable developments have been done. They are now running a main incline rapidly down in the vein. Bonhommie Company, situated in Marucus basin; vein 6 ft. wide, developed by two inclines, work progressing. Council Bluffs, good and well developed property. Minnie Wheeler, good property, developments in progress. Utah Silver Mining Company owns the Bannister, Monta, Midget, Neddie and Utah, and other mines. They have steam hoisting works, are well developed, and produce good ore. Badger, owned by the Southern Pier Mining Company; developments progressing. Hawkeye, owned by George Black, John Hughes, and others; good property, developed to a depth of 300 ft. Lowell, owned by Walker Brothers and J. M. Williamson: well developed, showing good ore. Boulder property, consisting of Homestake, Little Giant, and other mines.

The Sampson Company owns the Sampson, Ballman, Grand Price, Lincoln, Pay Book, United, and other mines. This property has a 40-horse power steam-engine. A two-compartment shaft has reached a depth of 200 ft., is well developed by over 4200 ft. of drifts and levels. Sampson Silver Mining Company's official report, Jan. 1, 1884: Ore sales, lot 19,455 sacks, gross 35,920 lbs., net 32,563 lbs., at $104 per ton, $1869·47; less mill and assay charges, $36·40; net total, $1662·07. Pay streak 4 to 12 in., high grade ore. The Baltimore Mining Company are the possessors of a very valuable property in a very fair and advanced state of development, well able to pay good dividends in a very short time. The Fairview Company owns and developes the Fairview and other good mines. The Union Company owns and developes the Crown Prince, Stuart, and other mines. Northern Belle, owned by Smith and Lubeck, has a 4-ft. vein of good carbonate ore. Disappointment, owned by D. Mara and Co., situated west of the Rebellion; strong vein of good carbonate and galena ore. As it would lead too far to describe all, I here confine myself in naming a few more of the principal properties, which are as follows:—Welsh Group, Hoyt, Park City, Schupbach, Kerr, Empire, Washakee Consolidated, John A. Hughes, Mohawk, Parish, McLaughlin, Pierson, Harwood, Pioneer, Lode Line, Potosi, Orient, Occident, Jupiter, Daniel O'Connell, Contact, Bonanza, Rosebud, Mountain Green, Glenco, Fourth of July, Wasatch East, Mary Ann, and Mountain Top, and the Kenelly group of mines.

The sampling works built by R. Mackintosh have and are proven a great success. The works embrace a main building 40 × 105 ft., to which is attached the engine and boiler room, 24 × 30 ft., ore sheds, 16 × 100 ft., two office buildings, wagon and railway platform scales, and platforms to handle the ore upon. A 30-horse power steam-engine works the large crusher, bar and pulp mills. All the works are substantial, convenient, first-class, well managed, and extensively patronised. W. BREDEMEYER, M.E., U.S. Surveyor.

*Salt Lake City, Jan.* 18

### CANADIAN MINING, RAILWAY, AND GENERAL NEWS.

SIR,—Again a New Year, and Canada is just beginning to awake, and England is just beginning to understand that there is such a place as Canada. Poor old England. She is like the "old woman that lived in a shoe, and had so many children she did'nt know what to do;" and it is no wonder she forgot all about the existence of Canada. I suppose there are people in England yet that think Ottawa is situated on the banks of the St. Lawrence, and that it is quite an usual pastime to shoot seven buffaloes before breakfast on one's door-step in Toronto. But the Canadian Pacific Railway is at last opening the eyes of the blind, and there are many obstinately blind even in Canada. There are many in the old provinces of Ontario and Quebec that persist in thinking they have better land than in the North-West, and persist in decrying a region that they know nothing about. We have had to fight against ignorance, prejudice, and misrepresentation—ignorance almost wilful from without, prejudice from the old provinces, and misrepresentation from the rival railroads in the States. Then the Grand Trunk Railway has not been inactive. The Grand Trunk Railway gets all the money it can out of Canada, breaks our laws with regard to running trains, takes our people on a suburban train and kills 28 of them the day of the New Year, and generally endeavours to ruin the country. We have a law on the Statute Book saying that the Grand Trunk Railway shall run a train from Montreal to Toronto, and from Toronto to Montreal, daily, consisting of three classes of cars—a first-class at 2d. currency a mile, a second-class at 1½d. a mile, and a third-class at 1d. a mile, Halifax currency. They have not fulfilled the law, and have never run, except one year, a third-class car.

What kind of a paper is the London Money Market Review? Do any of its readers that know anything about Canada believe its foolish statements? Is it not a paid organ of the Grand Trunk Railway? and if so, are they foolish enough to think they will improve the prospects of the Grand Trunk Railway by running down the Canadian Pacific Railway? One would suppose they might know enough to understand that the Canadian Pacific Railway runs through a much more fertile land than the old provinces of Canada—that the Grand Trunk Railway was built and run in the most extravagant manner, stations of stone that should have been cheap wooden structures, pay to directors, to Mr. So-and-so and Mr. So-and-so, balls and openings, large salaries, many officers, and many other expenses, which all came out of the shareholders. Whereas the Canadian Pacific Railway is constructed in the cheapest, quickest, and most economical manner, consistent with stability and safety, and the men engaged are directly interested in keeping a sharp look-out after the expenditure. Take the accident that occurred at Toronto the other day. It would have paid the Grand Trunk Railway better to have put down a double track to the Bolt Factory than to have smashed up two locomotives, and killed 28 men, without taking into consideration the humanitarian view of the loss of life, and the destitution of widows and children. Perhaps the London Money Market Review will send out a subscription to the relief fund. It has plenty of opportunity, as there are three or four lists started in Toronto.

It is certainly time for the investors in railroads to understand that a railroad that has $25,000,000 from Government, 25,000,000 acres of land, and an executive directly interested to the full amount of their own fortunes, running through a country that is as large as Europe, and can produce 30 bushels of wheat to the acre, is a much better investment than in a railroad that never paid anything to its shareholders, and whose officers prefer to smash up the company's property, and bring death and destitution on 30 families, rather than put down a double track to supply the Bolt Factory, only five miles from Toronto. The Canadian Pacific, from the time that Sir Hugh Allan first went to England to the present day, has had a bitter enemy in the Grand Trunk. We do not care if the papers would only confine themselves to the truth. What do the people of Canada care about their quarrels; but the people of Canada do care about having the truth placed before English readers.

It is only three years next spring since the charter of the Canadian Pacific Railway was passed, yet a continent has been opened up by it. If the people of England would understand that a country as large as Europe is being opened, that they can get 160 acres of land for taking it up and paying $10 or 2*l.*, and that those who get in first will be apt to do the best, I should think many would be found to take possession; but people who come should be workers, not idlers; they should have some funds to buy food and agricultural implements, and they should never come out alone. If they would form into bands of ten, get the land either from the Government or Canadian Pacific Railway, or Hudson's Bay Company, before they start, and have a captain who understood prairie farming, they would get on better. The shares of the company could be put at $10, and the proceeds of the crops would either go to pay the shareholders or to pay interest, as they might wish. People having money to lend would have better security if they knew the men in lending small sums on the security of 3200 acres of land to good men than in any other way. The farms could afford to pay at least 8 per cent. interest.—*Jan.* 10. BOURONITE.

P.S.—The Government allows 160 acres for homestead and 160 for pre-emption; total, 320 acres × 10 = 3200 acres.

### MINING ENTERPRISE IN COLORADO.

SIR,—In my communications to the Journal I have frequently stated that with the same care in making a purchase mining would not only become as safe as any other legitimate business, but also more profitable to those who invest. In support of this statement let me call the attention of your readers to the profitable returns of the various mines in this country during the year 1883, which amounted to $10,083,600; the total amount paid in dividends by these same mines up to the present time being $75,413,505 (15,500,000*l.*) Of this amount the Colorado mines paid the following sums:—

| | Total for 1883. | | Total to date. |
|---|---|---|---|
| Amie | $ 25,000 | ..... | $ 330,000 |
| Bassick | 300,000 | ..... | 300,000 |
| California Gold | 65,000 | ..... | 65,000 |
| Carbonate Hill | 60,000 | ..... | 60,000 |
| Catalpa | 30,000 | ..... | 240,000 |
| Dunkin | 10,000 | ..... | 210,000 |
| Evening Star | 75,000 | ..... | 1,300,000 |
| Iron Silver | 300,000 | ..... | 1,300,000 |
| Leadville Consolidated | 80,000 | ..... | 300,000 |
| Little Chief | 20,000 | ..... | 720,000 |
| Morning Star | 50,000 | ..... | 615,000 |
| Prussian | 15,000 | ..... | 132,000 |
| Silver Cord | 225,000 | ..... | 225,000 |
| Smuggler | 36,000 | ..... | 66,700 |
| Miscellaneous | 70,000 | ..... | 116,000 |
| Total | $1,361,000 | ..... | $6,009,700 |

The miscellaneous returns for the year, as shown in the foregoing statement, represent the amounts paid by half-a-dozen mines, including the Colorado United, Henriett, and others, but are too insignificant to receive individual mention. A great number of private companies in Leadville and other parts of the State, such as the Robert E. Lee, Matchless, &c., are not included in the above figures, neither do they include the returns of the Little Pittsburg, Cheysolite, Little Chief, and other famous mines before they were incorporated as public companies, the profits of which in the aggregate would amount to several millions dollars—a result that furnishes abundant proof of the statement that mining carried on legitimately is more profitable in the long run than any other kind of enterprise which is at present seeking the attention of the general public.

*Denver, Colorado, Jan.* 22. J. FITZ BRIND

### GOLD MINING, AND ITS MANAGEMENT—No. IX

SIR,—In drawing attention to the advantages of practical and experienced management in gold mining, and the enormous profits derived therefrom, as against the ignorance, reckless extravagance, and waste of time, capital, and labour indulged in by amateur managers and directors, at the expense of unfortunate shareholders, who have been deluded into investing their money by the specious promises held forth in glowing prospectuses, I have been imbued with the hope that such remarks would have the effect of drawing more attention as to the difference between good and bad management in gold mining, and as a result that a little more caution would be exercised by investors in gold mines as to whom they entrusted the expenditure of capital in developing mining properties.

There is an infatuation respecting gold mining and the results to be obtained therefrom, which are shadowed forth by irresponsible and incompetent persons, that are apt to delude the unwary investor, who becomes attracted (moth like) by a flaming prospectus from the excited imaginations of the professional promoter, who never saw a gold mine deeper than the pockets of his clients, and whose knowledge of the value of a gold mine or the best method of developing and working it profitably is on a par with his knowledge of the resources of the mountains of the moon. It is unfortunately in the hands of such advisers that so much capital has been subscribed and uselessly squandered during the last few years, which have led to results of a most disastrous nature. The enormous losses of capital by legitimate investors in gold mining through exaggerated reports, misrepresentations, extravagance, and ignorance in management, has had the effect of creating a feeling of distrust in gold mining that is not deserved.

For many years past in Australia and here I have occasionally had to draw attention to the deplorable waste of capital and labour in mining through the assumption of knowledge by amateurs, who imagine themselves competent to advise on the investment of capital in gold mining or the management of mines. Whenever there is an improvement in mining prospects in any place there at once arises a host of mushroom authorities, who spring into notice as the confidental advisers to investors as to what mines they should invest their money in, or under whose direction mining operations should be conducted. These men as a rule are representatives of all grades, classes, and callings, whose lack of knowledge of practical mining or the value of a mine is only equalled by their assurance in representing themselves as authorities on a subject, a knowledge of which can only be gained by experience and intelligent application. Their excited and fanciful imagination leads them and their friends, who are foolish enough to be guided by their judgment, into error and serious losses, for which the mining industry gets blamed instead of the reckless indiscretion of the adviser and advised, who, acting on the principle of the "blind leading the blind," blunder into the "slough of despond." And when the day of retribution arrives in the winding up of the dearly bought, ill-advised, and miserably mismanaged ventures, then the mushroom authorities, who have enjoyed a butterfly existence at the expense of their victims, fade into the obscurity from which it is a pity they ever emerged.

Week after week your columns set forth the history of mining companies ushered into existence with a flourish of trumpets, showing promises on paper and the laudatory explanations of visionary vendors and promoters as to the future profits that have suffered through a lingering disease of reckless high living, extravagance, and mismanagement, to be wound up in its death shroud by the inevitable liquidator.

If the majority of investors in gold mining would but take the trouble to exercise the ordinary amount of caution in investing in mines as they would do in their own business transactions by being assured that those whose advice they take have some knowledge of the subject on which they advise, and that they are possessed of practical knowledge and experience, then there would not have been in the past, nor will there be in the future, such a deplorable loss of money as has lately taken place. Had one tithe portion of the millions of money that have been subscribed and squandered in the purchase of high-priced properties, supposed to be auriferous, in India, Africa, and other places difficult of access, unhealthy in climate, and where the management for the most part had been in the hands of amateurs, been invested in legitimate and well-managed properties in Australia and America, from whence our gold supply is derived, and where there is positive and indisputable proof of the value and profitable nature of gold mining, then the investors would have had good returns for their capital, and not have had cause to rue the day they were led away by the shadowy promises of oily-tongued vendors and mining nonentities.

I have at different times put forth such information as to the profitable nature of gold mining in well-conducted enterprises in Australia and America, from which sources of newly discovered gold England has derived such important and marked increase of national wealth through the vast extension of trade and commerce consequent thereon that there need be no hesitation or doubt as to which countries or in what districts gold mining is now being, and can be profitably conducted, and from whence the future supply of gold can best be procured.

In your issues of Dec. 8 and 15 I gave an account of the dividends paid from a list of gold mines in Victoria now in active operation amounting to over 7,000,000*l.*, sterling and many of which are likely o

continue paying dividends for an equally successful career, whilst a list of American mines, also in active work, shows a list of dividends of over 14,000,000*l.* sterling. With evidence that cannot be disputed of the profiable nature of gold and silver mining when the operations are conducted by experienced and thoroughly practical men there should be no doubt or hesitation as to what countries and districts investors should direct their attention.

Since 1851 Australia and New Zealand have produced and poured into the lap of English finance, trade, commerce, and industries nearly 300,000,000*l.* sterling of gold, or a new purchasing power the extension of which cannot be measured by figures; while the United States of America have also produced in gold and silver nearly 500,000,000*l.* sterling in addition, a large proportion of which has also gravitated to England, to the benefit of its finance, trade, commerce, and industries.

With such substantial results already attained, and the certain prospects of an increasing and continuous supply of gold being obtained by the judicious investment of capital in the development of mines under experienced direction, there need be little fear of loss, while the profits are most likely to be of great magnitude. These results will only be obtained by honest legitimate mining in Nature's national bank of issue, which seldom fail to honour the drafts of labour judiciously expended in her storehouses of material wealth.

THOMAS CORNISH, M.E.,
Late of Australia, Author of "Gold Mining, its Results, and its Requirements," &c.

## MINING FOR THE PRECIOUS METALS.

SIR,—There can be no doubt but that in mining for the precious metals—gold and silver—both in Australia and America the most lucrative investments may be made. Statistics from these countries furnish abundant proofs that such is the fact, and whilst the figures which are published from time to time in the *Mining Journal* respecting the output and outcome of profits from selected mines exhibit startling results, the aggregate of all paying mines if given would be still more surprising, and if in addition to these account were taken of what might have been if many that have not paid remuneratively had been properly managed the sum total would have assumed enormous proportions. I restrict my remarks to this country and to this State especially in respect to the management of mines, and the misdirection and employment of capital impractically experimental objective pursuits, as I am not disposed to condemn what I have not had occular cognizance of entitling to such condemnation. It is passing strange that imagination should still dominate reason and the repeated adverse realisation of stern and mortifying facts produce no salutary effect to check the recklessness of headlong adventure and ardent intensity to compass and tangibly materialise an *ignis fatuus*. How long are the ordinary principles of business to be excluded from mining to its manifest injury and the injury of communities, trades, and commerce—to say nothing of the ignominious failures, and consequent losses of brainless adventures. Scarcely a week passes but that your valuable Journal evinces some reproaches in this regard, and yet no abatement of the craze is discernible.

It seems difficult to realise that properties as valuable as some of those represented on paper are said to be, and submitted to the public appealing for subscriptions, should be going begging for patronage, if their resources were as vast and as easily accessible as they are represented to be much more embarrassing to the sober estimates and espousals of reason is the enigma that they should be encumbered with mortgage liabilities. We have not forgotten the diamond swindle of Arizona, and to salt with gold is a more feasible experiment than to salt with diamonds; both practices have been resorted to, and with fatally effective success. It is to be hoped that we are not destined to witness a repetition of such occurences. It has been said "a scalded child dreads the fire;" and, financially, scalded adults ought not to be less permeated with prudential omotions and conservative reservations.

Precedents in everything except mining are almost always referred to and accepted as authoritative criteria on matters of doubtful interpretation; but on this line the wonderful eclipses the adverse of past precedents, and loftily ignores the universally recognised and accepted standards for practical guidance and discrimination of investments. The mesmeric infatuation boon of a licentious idealisation of ordinary objects appears to superinduce in certain temperaments a genuine credulity sympathetic to the verge of financial ruin with purposes designed to accomplish it, and which disease appears to be strangely inoculous. So far as my observation has extended or knowledge is concerned nothing in the world appears to be easier than to throw dirt in the eyes of professors of abstract science during their divertisement in the *role* of guides to practical mining, and that too without provoking any suspicion of occular obliquity or the crookedness of ledgerdemain, as their curriculum is frequently beyond the plane of philosophy, and occasionally transcends the limits of fact and reason. The sequel alone determines the propriety of definitely prescribed proceedings, comprising the specific courses of action and the anticipated issues, and oftener than not have results fatally falsified and inverted conclusion—the magic talisman by which the advent of such enterprises are heralded, and their patronage secured. Many a high official professor has succumbed with ignominious chagrin to humiliating disaster consequent on the treachery of schoolastic creeds as applied to the *denouement* of practical issues in respect of mining. At this point the Emma *fiasco* rises vividly into prominence as an *ensemble* of what may be again enacted. It is devoutly to be wished that there may be no repetition of such egregious and humiliating catastrophes—such unpardonable stigmas to blot, degrade, and dishonour the escutcheon of mining.

It is not surprising that a writer—Mr. Thos. Cornish, in the Supplement to the *Mining Journal* of Dec. 22, should inveigh against the reckless, if not random, estimates of gold scheme enterprises, especially in view of a prospectus which appeared in the same Journal a week previously, arithmetically inaccurate, logically defective, if not contradictory and reckless to the verge of official licentiousness. A cursory glance at it betrays such defects. If scientific professors are again to descend into the arena of mining, all that need be desired on behalf of the class they assume to supplant—the practical professionals—is a fair field and no favour, fully assured that the knowledge they possess of what is, and how to compass and achieve purposes, will survive the severest ordeal, and add lustre and distinction to their well-earned and long-sustained prestige. There need be no jealousy of classes; but for the integrity and success of mining one may well be jealous. Its well-being is of vital importance to many communities as well as to individuals who are more intimately associated with its fortunes, and pecuniously affected by its vicissitudes.

*Ione, Nye County, Nevada, Jan.* 14. ROBERT KNAPP.

## KAPANGA GOLD MINING COMPANY OF NEW ZEALAND.

SIR,—I was extremely pleased to read in last week's *Mining Journal* the letter of Mr. John Robertson, as it appears to me to embody in a practical sense the reasons why the Kapanga Gold Mining Company (Limited) of New Zealand has not been successful. A short time since, at the request of a few shareholders, I wrote to the secretary, embodying somewhat similar views to those expressed by Mr. Robertson, but received no reply. It seems to me to be a mere farce to get any more reports on the property. I have before me a circular of the secretary, dated May 24, 1881, in which the following occurs:—"The board of directors owing to this disappointment deemed it desirable to have the property examined by an independent person, and to request his estimate of the sum needed to complete the necessary work. Capt. Joseph Nancarrow, the chief Government Inspector at Wellington, was, therefore, requested to proceed to the mine, carefully examine the workings, and report accordingly."

I may mention that the words "this disappointment," above referred to, deal with the estimate of Capt. Thomas not having been borne out. The report of Capt. Nancarrow is well known to shareholders, and subsequent issues of capital are also well known; but how that capital has been spent does not appear to be generally understood. What is required in regard to this company at home and abroad is management; and the directors will be only acting on the general wishes of the shareholders by appointing a new working manager on the property at a low salary, with a good increase when the output realises a good profit. WM. W. BAKER.

*Bristol, Feb.* 7.

## FRONTINO AND BOLIVIA GOLD MINES.

SIR,—These mines consist of a group of eight separate mines. In August, 1880, there were stamped 1722 tons of ore, yielding 24 dwts. of gold per ton, and a profit of 3584*l.* resulted. In September, 1881, these items were 1832 tons, 26 dwts., 2520*l.* profits. October and November, 1883, give respectively—ore, 3469 tons; yield, 12½ dwts.; profit, 349*l.*; and ore, 3137 tons; yield, 14 dwts.; profit, 781*l.*

Now, had there been only one mine, the fluctuations of the yield of gold per ton could have been easily comprehended; but, as the fluctuations affect the whole group of eight mines, it is more difficult to understand why this should be so. From the result in November, 1883, it is evident that with a yield of 11 dwts. per ton there would be no profit, even upon the very large quantity of ore stamped. But were the yield of gold in October, 1883, as it was in August, 1881—29 dwts. per ton—then, the costs being 5947*l.*, the value of the gold would have been 13,743*l.*, and the profit 7796*l.* for October, 1883. The rise of 1½ dwt. per ton in the yield of gold in November, 1883, over that in October raised the profits from 349*l.* to 781*l.*, or at the rate of 288*l.* for each dwt. of advance in the yield. Then comparing this month with September, 1881, I find that had the yield in November, 1883, been as in September, 1881—26 dwts. per ton of ore. The profit for the month upon 3137 tons of ore stamped would have been 4237*l.* in place of only 781*l.*

There has been a progressive falling off in the yield of gold per ton from a maximum of 29 dwts. in one month down to 12½ dwts. in November, 1883, and this for the collective group of eight mines. Now, with such yields as have prevailed for a long while shareholders need not expect any dividends worth naming—not 1 per cent. even upon the capital invested. The quantities of ore raised and stamped fully bear out Mr. Robert White's predictions; but the yield per ton of ore is miserable, seeing what it formerly was for months together. It is useless to refer to what is done in Australia, for the Frontino Mines are in a very different district.

Increased richness of their ore is all that the Frontino shareholders have to look to and hope for in the future. This question is one well worthy of the closest attention on the part of the directors and the managers of the mines.—*Feb.* 4. RECIPROCITY.

## THE NOUVEAU MONDE GOLD MINING COMPANY.

SIR,—Referring to Mr. Nicholson's letter in last week's Journal on the subject of the Nacupai Gold Mining Company and its association with the ever notorious Nouveau Monde, I do not quite agree with him as to the history of the latter being so well known to the British public, otherwise they would shun connection with it as with the plague. Shortly after the discovery of gold in California in 1848, the Nouveau Monde Company was formed in Paris and entered into negociations with Colonel Fremont for the purchase from him of certain mining grants in California. Disputes arose and costly litigation was entered on which continued for many years, the whole original capital of the company was squandered away, and new capital subscribed time and again without the company ever acquiring the legal title to a gold mine in California. The history of this company surpasses anything to be found in the Arabian Nights, and disclosed the astounding fact that its administrators have shorn the public in every quarter of the globe; in fact, in no country to a greater extent than in the United States. I naturally supposed that this company had become defunct a quarter of a century ago; but the name appeared to have a charm for the shearers of the public. Its name remains the same, but its field of operations is now in Venezuela. How it got quoted as a Venezuela mine, I will briefly relate:—The gérant of this company became acquainted with a Corsican gentleman, a countrymen of his resident at Ciudad Bolivar, and the latter proposed to provide him with the long-sought mine. This was the Venezuela Eureka, but when this property was examined by an engineer sent out by some friends of the gérant the mine was not considered good enough. At the same time there was the property of the bankrupt Orinico Mining and Exploring Company for sale. This property had made in its day good returns, and it suited the gérant, but the means to purchase were wanting. At this period the Nouveau Monde was not I believe possessed of a single shilling, but the happy thought struck the gérant that if all the old shares were called in to be vised he could ascertain how many had been destroyed as waste paper. This operation complying with the French law took months to complete. Curiosity became excited, and the cupidity of some gentlemen of Greek nationality led them to rig the market for Nouveau Monde shares, running them from nothing to a price above par. New shares were issued for those destroyed, and by that means the riggers of the market provided 20,000*l.*, besides a large profit to themselves.

The properties of the Orinico Mining and Exploring Company were sold to C. C. Fitzgerald, late of the Potosi, for the sum of $250,000 American gold. This gentleman transferred his purchase to the Nouveau Monde for the same sum, plus a commission of $50,000, which were drawn for but not paid. The Nouveau Monde paid 20,000*l.* on account of the property, and undertook to pay the balance within six months. The six months expired, and they got another six months granted, but were again unable to pay.

The property was again offered for sale, and was purchased by Señor M. Pallazzi, of Ciudad Bolivar, for about 32,000*l.* This gentleman resold it to a syndicate in Paris and London for about 41,000*l.*, commission included. This syndicate recognised the 20,000*l.* paid by the Nouveau Monde, which had, in fact, been forfeited. The syndicate then proceeded to register a company called the Nacupai Gold Mining Company, with the stupendous capital of 603,000*l.*, in which the Nouveau Monde Company were given shares to the amount of 150,000*l.* for the payment they had made of 20,000*l.*, so that the Nouveau Monde, after a roving commission of more than 30 years, at last became interested in a real mine. Misfortune, however, seemed to dog the steps of the Nouveau Monde, as their fosterparent, the Nacupai, seems to be possessed of rather an uncertain title. By latest advices from Venezuela, the Government itself seems to have doubts as to the titles held by this company, and in November last issued a decree ordering all title-deeds of mines in Venezuela and Guayana to be sent up to Caracas for revision and approval; and I am credibly informed that when this is done it will be found that they have no title whatever to Austin No. 9, and very doubtful ones as to Nos. 1, 2, 3, 4, 5, 6, 7, 8, and 10. JOSEPH NELSON.

*London, Feb.* 7.

## WEST AFRICAN GOLD FIELDS.

SIR,—I, too, was induced by the same reason as your correspondent "Original Shareholder" to apply for shares in the above mine, and I need hardly say they were allotted to me. A few letters also have passed between the secretary and myself, eliciting much the same information as that obtained by your correspondent; but although the directors, as such, have told us but little concerning the progress or prospects of the mine, yet in an informal way the shareholders' hopes have been raised to a very high pitch by communications from no less an individual than Commander Cameron, the managing director, who for the last 12 months has been at the mine, such communications being directed to an ex-director, Capt. Burton, and published by him. Let me give one or two extracts. May 12, 1883, Capt. Burton says—Commander Cameron writes me—"When I got the engine to work I shall wash at least 100*l.* per day, and I hope soon to be pumping." On the 24th of the same month, Cameron estimates he "can wash 4000 tons daily, and gives the money result at 330*l.*" Again, "I am sending home," writes Cameron, "about 1½ oz. of gold, mostly pure; we worked it out of about 100 lbs. of stuff," and, as Burton remarks, this means 80*l.* per ton.

Now surely, Mr. Editor, with such promising accounts before one, and coming, mind you, not from unknown mining agents, but from two such men as Cameron and Burton, it was rather hard to be laughed at by wife and daughters when with pencil and paper I began to find out by the rule of multiplication how much 333*l.* daily would produce in the course of a year, and to speculate as to the amount that would fall to my lot. Excusable also was it to hope with the manager that we were on the eve of a brilliant success, and very anxious also to hear when the engine could be ready to wash down those thousands of tons of rich soil daily which was to benefit us so largely. What pleasure then when at last the news arrived from Cameron himself that he had washed down between 1000 and 1500 tons, and that in the boxes and wash-up he had about 40 tons concentrated from that, and that he hoped to get some stuff away home which would be worth something. But, alas! alas! although some four months and more have come and gone since the receipt of that pleasurable news nothing more have we poor shareholders heard. My poor enquiry produces no reply from the secretary, and even the enthusiastic Burton is silent. It may be of course that Cameron has a surprise in store for us; if so we will forgive him the silence, but if, as is no doubt the case, he has been deceived, and so innocently has deceived us, then let us know at once, and that our fond prospect of a nice little sum on which to make merry in our old age has after all only been as a pleasant though foolish dream.

*Yarmouth, Feb.* 6. W. S. R.

## THE TRANSVAAL GOLD FIELDS.

SIR,—We have lately had the opinion of Mr. Kitto about the Transvaal gold fields, but since this gentleman states that it was in the spring of 1881 that he visited these gold fields, and as the most valuable and important discoveries about reefing have only been made there since 18 months or two years, his opinion cannot be of the guidance he wishes to put on it. Surely the reports of such gentlemen as Hamilton, Stuart, Webster, Penning, Dunn (Cape Government Geologist), Cuttwell, Pascoe, Atcherley, Glinister (the late Gold Commissioner), who have examined different properties on the Transvaal gold fields since these new important discoveries were made, and confirming them, are of more reliance, and cannot be called antiquated. It is ridiculous to see the Indian fiasco always introduced, when Mr. Kitto himself owns that the Transvaal gold fields up to 1881 (for a period of six years) produced nearly a million of money, and this without any machinery whatever, and in the most primitive manner: and what have the Indian gold mines done with machinery? Since the concessions were granted the greatest part of the Transvaal fields were not worked at all, pending the formation of companies and erection of machinery, and still gold (the production of the few remaining private diggings) keeps on arriving in England weekly from the Transvaal. In conclusion, I may say, whether correspondence is signed with a pseudopym or in one's own name, personalities ought to be left out of it. CITIZEN.

*Feb.* 5.

[The above letter was written before the result of the crushing was known.]

## MARBELLA IRON ORE COMPANY.

SIR,—The shareholders of this company cannot fail to be satisfied with the dividend just declared by the directors, subject to audit. This profit for the year was made entirely during the last six months of it, as, by reference to the directors' report, issued about six months ago, the first six months of the year was almost entirely occupied in removing the debris brought down by the monster blast. The advantages of this large amount of dead-work, in the removal of the overlay on a large scale, are now being realised by a considerable cheapening in the cost of production.

The company is in a highly satisfactory financial position, it has no debts in the shape of loans or debentures, its working capital is intact, and by the addition of 2000*l.*, proposed to be made, the reserve fund will stand at 8000*l.* America being the chief consumer of the company's ores, it is satisfactory to observe a very distinct improvement in the iron trade of that country. A. S.

*Reform Club, Feb.* 6.

## FAIR TRADE, AND FREE TRADE.

SIR,—The champion of Free Trade, Mr. Bright, being still found treating any modification of the present one-sided system with scorn, it may be profitable in a matter of such national importance to test fairly the value of his general opinions as a statesman. It has already been shown in the columns of the *Mining Journal* that his views many years since with regard to the reduction of the army and navy, in face of all Europe bristling with bayonets, were utterly unsound and intensely dangerous, and it has also been shown that no greater error was ever committed by man than was his representation that all the world would be rushing into the arms of England when Free Trade became the ruling passion of the land.

A blunder of an equally strange and bold kind was made by him in his dealing with the affairs of Ireland in 1866. During that year he paid a visit to Dublin, and in a series of characteristic reckless speeches to an excitable people he represented that his own countrymen had always behaved badly to Ireland, and at the same time indulged in such rash unruly utterances with regard to the right of the people to the soil as to call down on himself the thunder of the Times. Attacking on that occasion with his usual wrath the Protestant Church of Ireland, he told his hearers that—"The removal of the Irish Protestant Church would create a new political and social atmosphere in Ireland; would make the people free, and that old things would pass away and all things would become new." This object of his desire has since been accomplished, the Church has been both disestablished and disendowed, and the loyal Protestant Churchman has been deprived of his birthright, but Ireland is at this moment in a blaze of rebellion.

Returning to the question of Free Trade, the question on which Mr. Bright is everlastingly blowing his own trumpet, it may be worth while for a moment to take a look at the remarkable position of the Cobden Club, which prides itself on the support of Mr. Bright, Mr. Chamberlain, and Mr. Cross. According to Mr. Chamberlain's calculation it appears that since the date of Free Trade England—a coal and iron producing and a manufacturing country—has imported 1640 millions sterling more than has been exported, which men of commercial experience look upon as by no means a sign of increasing prosperity.

Not so, however, the members of the Cobden Club, and Mr. Cross in the House of Commons in August, 1881, actually made use of the following argument to prove the contrary. He on that occasion said that, "1000*l.* will buy 2000 tons of coal free on board at Cardiff, the freight of this coal to San Francisco will be 1500*l.*, the amount realised for it in San Francisco will be 2500*l.*; which sum invested in wheat will purchase 2000 qrs. The conveyance of this wheat to Liverpool will cost 1500*l.*, and it will require to be sold at 4000*l.* in Liverpool to cover cost and expenses. In the import tables there will be an entry of 4000*l.* wheat; in the export tables there will be an entry of 1000*l.* coal." Now, on looking at this statement it will appear at a glance that according to this style of argument the merchant on arriving at San Francisco and selling his cargo not only keeps his own 1000*l.*, but appropriates the 1500*l.* due to the shipowners, and coolly invests the whole amount in the purchase of a cargo of wheat for himself. How the shipowner is to live, or how he is to manage to pay the sailors and meet his expenses at San Francisco and elsewhere on the voyage out and home is a mystery Mr. Cross did not unfold to his applauding supporters in the House.

And it is by such arguments as these, uttered in presence of a body of representatives specially selected to enact laws for the government of a great commercial country, that the fatuitous system of so-called Free Trade is propped up.

Speaking, some time since, on the subject of "The Trade of England and the World," Mr. Crickmay, of the Bank of England, referred to the adverse balance of trade, and regretted the manner in which it was treated by certain politicians of the present day. "Some said it was a proof of our wealth that we should be able to import so much more than we exported. The logical conclusion of this was, that when matters had ran their length and our exports became conspicuous by their absence, we should be richer than ever." In the same speech Mr. Crickmay compared our recent imports and exports of gold with those of a few years since. In the 13 years from 1866 to 1878 there was an excess of imports of more than 4,000,000*l.* over the exports; but in the years 1877-81 there was an excess of from 4,000,000*l.* to 4,500,000*l.* of exports over imports, showing a drain on our stock of gold which, if continued, would

cause people to ask, who was going to be the last to get five sovereigns for a 5*l.* note?" "It is only a rich country that can take gold and keep it." America has now millions of gold in her coffers, whereas in 1866 she had not an ounce. During the 13 years ending 1880 the general exports of England fell short of the imports to the extent of 1,119,887,157*l.*—a startling balance on the weak side of the edger.—*Tavistock, Feb. 5.* ARGUS.

## FAIR TRADE, AND PROTECTION.

SIR,—Whatever may be brought forward in favour of one of England's greatest curses of the present day—Free Trade, so called—Free Trade in fact is not in existence. Far more may be justly said against it. We impose duties on tea, coffee, tobacco, &c.—articles we cannot produce—and at the same time admit such as French cutlery—articles we can produce—scissors to wit. A trade like sugar we have been robbed of. French travellers sell their cutlery even in Sheffield, whilst our cutlers are starving. Yankee clocks, and all manner of articles we can produce, are also brought into our country duty free. Such a wicked state of affairs, I say, is an outrage on our workmen and manufacturers. Why is tea taxed if Free Trade is such a blessing? We have prospered under its beneficent rule. How about France and America, who have protected more than we, whilst we, poor fools, are doing the opposite? The Free Trader never adduces in his argument what railways, penny postage, telegraphs, &c., have done for us. No; everything is credited to Free Trade. I say tax silks, French wines, or any kind of luxuries, to the fullest extent; but such is not the case. These are very lightly taxed, especially French wines, which is easily accounted for, as Mr. Gladstone is said to be one of the largest partners in the firm of Messrs. W. and A. Gilbey. Mr. Lowther has been sneered at for his proposed 5*s.* per quarter on corn; but there is more merit in his proposal than some will dare to admit. Encourage to the utmost a trade with our colonies, as they alone could supply our wants in grain, and let it come from them duty free. Yes; let us go in for Imperial confederation, and unite our colonies to the mother country, and not estrange them as the present Government are not leaving a stone unturned to accomplish. I maintain that there is no just comparison betwixt the English and American farmer. The latter will not be so prosperous by-and-bye, when the virginity of the soil is gone. In the commonest of justice to English manufacturers many species of goods from America and France ought to be taxed; some of ours going to the former country pay as much as 75 to 80 per cent., and to the latter nearly as much.

One case of the glaring wrong we are suffering under which has come within my own experience: Not long ago an English gentleman was taking his carriage with him over to France for a few months and had to pay the abominable sum of 7*l.* 10*s.* before he could land it, whereas French carriages are sent over here free from tariff by the hundred, and yet tea, &c., are taxed. It is not necessary to tax tobacco. Let the working man have at least one of his few luxuries cheap. Every day that passes proves to me more and more that we are running in an unequal rate. Such a state of affairs as I have given is antagonistic to the feelings of an Englishman who has as much spirit as a dead rat; and yet we were told by a correspondent in the *Mining Journal* a week or so ago to appeal to history on this question as to its sublimity. The very fact of the principal exponents of this so-called Free Trade stamps it as ungenuine—Who are they? Are they the men in whose hands are the destinies of our once world-wide honoured country? Are these homicidal politicians the men who are to make us laws? God forbid their reign should last long. We are advised to appeal to history when its pages are black with the hypocritical deeds of those who are ever preaching consistency—a thing which is as foreign to them as the inhabitants of the planet Venus.—*Perranporth, Feb. 5.* W. NINESS.

## INDUSTRIAL PROSPERITY OF IRELAND.

SIR,—Sir Edward Sullivan, in his very able and interesting article on "The Financial Prosperity of Ireland" that appeared in last week's *Mining Journal*, has done good service. Permit me to add a short extract bearing on this important subject from a political speech I had occasion to deliver in Stirling last November.

Speaking of Ireland in the present number of the Nineteenth Century Earl Grey says:—"At this moment obedience to the law (such as there is) and tranquility are only maintained in Ireland by a wisely stern exercise of the great powers with which the Executive Government has been armed by the exceedingly severe Act of Parliament after the Phœnix Park murders. There are few individuals who are acquainted with the condition of Ireland and the feelings of her people who have any doubt that if these powers were withdrawn or were exercised with less firmness than they are, the authority of the law would again be triumphantly set at defiance throughout the country.

"At present the rights and liberties of individuals are very wisely restricted in Ireland, and the Executive Government is there armed with powers far larger than it would be right to entrust to it except under the severe pressure of necessity. Yet hardly any man not connected with party agitation believes that these extraordinary powers can be safely dispensed with, and it is generally felt that they cannot be relinquished until there shall be such a change in the temper of the Irish people that they will yield a willing obedience to the authority of the Imperial Government. To bring about this change is, therefore, what is wanted, and to find the means of doing so is the problem to be dealt with." Precisely so; but this so-called Liberal Government has no further policy to produce; it rests sublimely satisfied in the consideration that the "amelioration of the condition of our fellow-subjects in Ireland" is being accomplished by coercion measures, and that under the sunshine of these measures order is being restored, and Irish affairs generally are assuming a comparatively tranquil condition. * * * *

Now, the attitude of Ireland to England at present is by no means a pleasant one. Ireland feels, and justly so, that in the past it has received injuries from England. There is, therefore, some reason for Ireland's distrust of England's intentions; of Ireland's distrust of English remedies; and for Ireland's wish to become her own physician. It is one of the most patent facts in history that Ireland in the past has been subjected to a system of alternate coaxing and cudgelling, of concession and coercion. Now, let us for one moment consider that important factor in Irish life the land, but let us also consider it in connection with Irish manufactures and the development of the industrial resources of Ireland. It is a notable fact that the Irish are almost wholly dependent on the land; nay, for a long time were wholly dependent on a single root, the everlasting potato. But the potato disease, followed by that terrible famine, indicated in no uncertain note the error of a whole nation thus relying for subsistence on a single root. Well, in that extremity many perished, many were packed out of the country, and many received charity. The lesson was a severe one, but it was required, and from that date the Irish ceased to rely on the potato alone. Now, coming to our times, we have the nation thrown into convulsions on account of the land and other questions.

Something must be done for the bettering of the condition of the people—some radical change, if change is necessary. Of course as before emigration comes largely into play, many of our Irish friends think Home Rule the radical change required to bring about a millennium, while the energies of a British Parliament have too long been directed to the tinkering of the Land Laws. I now crave your consideration for a moment, Sir, to an outstanding system of British selfishness, which has helped, I think, in no small way to bring about the present unhappy condition of affairs in Ireland. I have already alluded to the rather trite fact of Irish dependence on the land. Nor does the common supposition of Irish attachment to agricultural employment supply us with any adequate reason why this is so. The fact is that the Irish, possessing a country with every natural advantage in point of situation and harbourage, have been shamefully prevented from becoming a commercial nation. In the words of John Morley, in reference to this grievance, "The industry of the Anglo-Irish traders was restricted, their commerce and even their productions fettered, their prosperity checked, for the benefits of the merchants of Manchester and Bristol." These are literal facts. Nay, more, there is scarcely a single manufacture in which the Irish ever seemed likely to excel than in selfish fear, it was rudely trampled upon by the English nation.

This, then, is my argument, that we have brought about the dependence of the Irish upon the precarious produce of the land alone, by repressing and hampering commercial enterprise from purely selfish motives; therefore, we can only hope to restore prosperity by encouraging manufactures, and the development of the industrial resources of the country. The lesson taught by the famine which followed the potato disease was "it is bad for a whole nation to rely on a single root"; the lesson taught by the land disturbance is "it is bad for a whole nation to be solely dependent on the precarious produce of the soil." Let our attention, therefore, be directed to the encouragement of the manufactures and industries of Ireland, and at the same time let us condemn a Government which has nothing to propose towards the bettering of the condition of the Irish people, but must flaunt for admiration in our very eyes their coercion measures and their tinkerings of the land laws.

*Stirling, Feb. 7.* R. LUMSDEN.

## GOLD AMALGAMATION.

SIR,—I read Mr. M. Parry Gosset's letter on this subject in last week's Journal with much interest. Rightly or wrongly, I did not implicitly believe in the possibility of doing what Mr. Moon publicly announced that he had done—extracted by amalgamation with pure mercury only all the contained gold and silver of arsenical pyrites, &c. I regret that I am still held captive in the same opinion, although I should not at all object to have this spirit of unbelief cast out by anybody able to do it. Mr. Moon's generous advocate, Mr. Gosset, writes:—"If Mr. Moon has accomplished such wonderful results, he may be excused any exuberation of spirits." That, however, I venture to submit, depends a good deal upon whether "proof spirits" be exhibited or not. Proof in Mr. Moon's case appeared somewhat scanty. Further evidence, though of a rather subjunctive character, has been adduced by Mr. Gosset in the letter referred to, and more will be probably forthcoming in corroboration from other sources; for it is not conceivable that the new light thrown upon this important subject by Mr. Moon, in a region where the acquisition of vast wealth hinges on it, will be for the moment disregarded. If fact, it will herald itself, and be welcomed everywhere.

However, without waiting the advent of more proofs, and notwithstanding all heretofore experiences to the contrary, I unhesitatingly say—If Mr. Gosset, as a Fellow of the Chemical Society, will declare of his own knowledge that Mr. Moon, with only ordinary mercury, can obtain from arsenical pyrites, and its refractory associates, &c., all the gold and silver contained in them I will believe him on the instant without further question, and gladly drop the subject, as it can scarcely be considered very edifying to the readers of the Journal.

The manager of the Cid Copper Mines, N.C., as per Mr. Gosset's communication, writes of Mr. Moon's invention:—"It certainly has no equal in any other amalgamator now in use." In short, it is the best. There is a large family of "Bests," differing very much in degrees of excellence. Some of them are bad, if not worse. But, assuming that the manager referred to above has actually seen all of them, and critically noted their merits and demerits, and that what he writes is absolute truth, that is not the point at issue, but is one considerably in advance of it.

Mr. Moon appropriates the inclusive little word all to his own mightiness as regards his mode of gold saving. For the present I am obliged to take exception to this assumption by him, or by anybody else. I may be wrong, people often are wrong, without novelty or knowing it. I hope, however, that Mr. Moon and Mr. Gosset will leave me and my mode of amalgamation to take care of ourselves, and that they will be able presently to heap proof upon proof of their confident assertions upon the amalgamation conquest upheld by them. The new world will appreciate the proofs to the full; but Mr. Moon will allow me to hint very delicately that in the old world since he left it the benighted people have not all become such exemplary patient Christians as to turn the left cheek to be smitten on the instant the right cheek had been so treated. In the U. K. (where, as elsewhere, things are not altogether O. K.) the general feeling just now does not seem much that way inclined. *Vincet veritas* is a half-encouraging motto only, because the idea held in it is often a tediously long while coming to the light.

So long as we are in this world we must expect to see crushing and grinding operations going on in a variety of ways, together with more or less imperfect amalgamation of the most precious things in life; and those, no doubt, are the wisest amongst us who wait the most patiently for the coming of the next world, in which we are promised that all will be happily changed for the better, and complete amalgamation effected, of a kind that eye has never yet seen, and about which, therefore, more can be thought than said.

*London, Feb. 7.* T. A. READWIN, F.G.S.

## GOLD AMALGAMATION.

SIR,—In Mr. Burchard's report (Director U.S. Mint Official Report on the Gold and Silver Production of the United States for 1882) he gives instances of the loss of gold at from 40 to 50 per cent. "One of the oldest and best mining authorities in California (Mr. Almarin B. Paul) has said on this subject, as far as California is concerned, I am satisfied that not more than 40 per cent. of her gold is exhausted. The fact is, as before stated, we are not working to save gold, but to crush rock."

"Fossett's tables of seven years' work in Colorado show an average loss of more than 60 per cent."

"The London Quarterly Journal of Science says the gold caught on the plates is under the most favourable circumstances only 40 per cent. of the assay value of the ore, and the saving by blankets and buddle concentrations is only 5 per cent., so that when treating the most tractable of the sulphurets battery amalgamation does not secure more than 45 per cent. of the gold."

"Mr. A. Reichenecker, an acknowledged authority says, the proportion of gold saved on plates and tables varies in a well-constructed mill between 30 and 50 per cent. of the whole amount of gold in quartz, and may average 40 per cent."

"The Nevada Transcript (Col.) remarks that at the Merifield Mine, on Deer Creek, that a large proportion of the ore is heavily charged with sulphurets, and that after using the Frue concentrator and others they are satisfied that two-thirds of the gold in the rock is lost."

"Prof. Eggleston says the loss is between 50 and 60 per cent. of the gold in the ore."

Of California Mr. Burchard says—"The simple truth is that the wealth, next to the inexhaustible gold wealth of California, lies in the so-called rebellious ores themselves, which are in no sense rebellious other than that the gold which they contain cannot be extracted by any known free-milling amalgamating process any more than roast beef can be converted into chicken soup or fish into flesh."

There have been many processes invented from time to time which undoubtedly do much better than ordinary "free-milling," but the best of them do not save much more than 80 per cent. of the gold contained in the ores, and when the cost is taken into consideration a large percentage of gold saved goes to pay expenses incurred. Then, again, the apparatus is not always within the means of those who require it most. The chemical re-agents, acids, &c., cannot always be obtained except at a prohibitive cost. Lastly, the ores must invariably contain a large percentage of gold—poor ores cannot be treated with any pecuniary advantage. I am of course referring to "refractory" ores. However, all this is too well known to those interested in mining, and it is of no use enlarging on the defects. The real question at issue is how to remedy the evil. I do not presume to take any credit for my investigations, but at the same time it cannot be too well known that a remedy has been found. The wave-plate amalgamator will prove a source of profit not only to the inventor, but it is not too much to say also the salvation of many gold companies now in existence. Rebellious ores are not the only obstacle to economical and successful gold mining. The treatment of the "free ores" can be very profitably improved upon. Gold is found coarse, and fine as flour gold, which latter is so light, owing to the state of fine division which it is in, that it either floats on the surface of the water or is carried away among the tailings and lost. I suppose that nearly 20 per cent. of the assay contents of free gold ores is invariably lost. The wave-plate amalgamator will save all this. It has done so, and is doing so, and when the question of expense arises I am sure there is no amalgamating process in existence which can begin to compare with the wave-plate amalgamator for economy of power and labour, not to mention the gold saved, which has been computed by competent authorities at the rate of cent. per cent.—*Old Broad-street, Feb. 5.* M. PARRY GOSSET.

## THE LATE MR. WILLIAM BIRD.

SIR,—We shall be glad if you can find room for the following short obituary of Mr. William Bird, as after having worked with him so many years, and succeeded to the business, we should not like to let the occasion of his death pass without paying a tribute of gratitude to his memory. We believe we are right in stating that one of the leading characters of the English iron trade passed away on Wednesday last, when Mr. William Bird, the founder, and for many years the chief of the firm of William Bird and Co., died in his 79th year.

The deceased gentleman founded the firm of William Bird and Co. in 1829, and retired from it in 1872, after an active business life of nearly half a century; and through his energy, practical knowledge, singleness of purpose, and well-known straightforwardness, he raised his house to eminence, and in time almost monopolised the English iron trade with Germany. But such a scope did not satisfy his ambition. Wherever he saw an opportunity to open new channels for the English iron trade, or when an importation of foreign makes appeared advantageous he never hesitated to undertake the business. It was principally owing to his influence that a contract for 40 locomotives was given to Messrs. Schneider, of Creusot, by the Great Eastern Railway Company of England. He looked upon iron as one of the principal levers in the development of civilisation, to which he devoted all his energy as a declared free-trader.

He was one of the first to point out to the old East India Company the importance of railways for their country, and lived long enough to enjoy the triumph of his opinions. He was also one of the founders, and to the end of his life one of the directors, of the San Paulo Railway, one of the most prosperous of the Brazilian railway enterprizes, which still gives the highest dividends; he was for over 30 years a director of the London Joint Stock Bank, and for a long time a magistrate for the county of Middlesex. When, after the success of the first World's Exhibition in London, a second was held in Paris, it fell to the lot of Mr. William Bird to represent to a great extent the English iron rolling trade. He had a very complete, and for the time, very large assortment of sections in Paris, and having acted on the International Jury, he received as an acknowledgment for the services rendered the Cross of the Legion of Honour. Mr. William Bird foresaw the importance of the discoveries of Sir Henry Bessemer and Mr. Mushet, and the consequent revolution of the English iron industry, and he assisted its development by large importations of speigeleisen from Germany, and later on of ferro-manganese, for the production of the highest classes of steel.

Wherever we look we find his keen eye fixed on the future, singling out what was practicable; faithful to all obligations undertaken, liberal in the best sense of the word, without any party feeling, a cosmopolitan, inasmuch as he considered the world as his home, and the well-being of the many as the object of his life; just towards everyone. Such is his picture as it rises before our eyes, and as we desire to see it handed down to posterity. BOLLING AND LOWE.

*Laurence Pountney-hill, Feb. 1.*

## MINING FORTY YEARS AGO

SIR,—It may be interesting to readers of the *Mining Journal* and to shareholders in some mines which have been started again, or are about to be so, to know what has been done in the past. I, therefore, subjoin a week's list:—

Mining intelligence, Friday, April 17, 1840: No sale this week. Average standard and produce of last week's sale, 110*l.* 6*s.* 7½*d.*—Copper ores for sale at Redruth, April 23, 1840: Tresavean, 700; Fowey Consols, 359; Trethellan, 220; Levant, 219; Duffield, 205; Tretoil, 130; East Crinnis, 113; North Downs, 70; Wheal Garland, 68; Pembroke, 40; East Relistian, 16=2140 tons 21 cwts.—Copper ores for sale at Redruth, April 30: United Mines, 1228; Consols, 484; Hallenbeagle, 454; Godolphin, 213; Fowey Consols, 211; Tresavean, 189; Great St. George, 169; Great Wheal Charlotte, 123; Carzise, 55; West Fowey Consols, 37; Polbreen, 26; Wheal Curtis, 25; Cliggar Mine, 20=3234 tons 21 cwts.

Copper ores sold by private contract, March 13:—

| Mines. | Tons. | Price. | Purchasers. |
|---|---|---|---|
| South Caradon | 104 | £ 7 3 0 | Williams, Foster, & Co. |
| ditto | 90 | 6 6 6 | ditto |

Black tin sold at Treloweth, April, 14, 1840:—

| Mines. | Tons. | Price. | Purchasers. |
|---|---|---|---|
| St. Ives Consols | 23 | £44 0 0 | Bissoe, Bridge, & Co. |
| ditto | 21 | 45 2 6 | ditto |
| Charlestown Mines | 20¾ | 45 0 0 | Batton and Son. |
| ditto | 6¼ | 43 12 6 | Williams, Harvey, c. |
| Great Work | 26 | 45 0 0 | Batton and Son. |
| Wheal May | 23½ | 48 15 0 | Bolitho and Co. |
| ditto | — | 44 15 0 | Williams and Co., and Bissoe, Bridge, & Co. |
| Boscaswell | 22 | 46 17 6 | ditto |
| Balleswidden | 15¼ | 46 10 0 | ditto |
| ditto | 5½ | 43 10 0 | ditto |
| Wheal Owles | 11 | 48 17 6 | Bolitho and Co., and Williams and Co. |
| ditto | 8 | 48 12 6 | do do |
| Wheal Ruth | 12½ | 44 0 0 | do do |
| ditto | 2 | 40 17 6 | Bolitho, Carne, & Co. |
| ditto | 1 | 43 2 6 | ditto |
| Boscarn | 12 | 49 2 6 | Bolitho and Co., and Williams and Co. |
| Carzise | 12 | 46 12 6 | do do |
| Tincroft Consols | 11 | 44 10 0 | L. C. and W. Daubuz. |
| ditto | 1 | 30 0 0 | Bissoe, Bridge, & Co. |
| Boswidden | 8 | 45 5 0 | Daubuz, Williams, &c |
| Levant | 7 | 41 12 6 | Grenfell, Bolitho, &c. |
| Rosewall Hill | 7 | 45 12 6 | Bolitho and Co., and Williams and Co. |
| Parknoweth | 2¼ | 48 0 0 | Batton and Son. |

Total quantity of black tin, 258 tons 10 cwts.

Now, comparing these figures with those that are published with regard to current sales, all must admit that we are not doing as much as we ought; but that there need be no fear as to the future. Cornwall has recovered from depression before, and will do so again. Capital now sent into the county can be so invested that large profits must follow.—*Wadebridge, Feb. 5.* W. PAYNTER, Jun.

## YEOLAND CONSOLS.

SIR,—It is not surprising that the general public should view mining investment with increasing apprehension at a time when to its inherent uncertainty is superadded the difficulty of arriving at the truth respecting the handling of funds entrusted to directors. This difficulty investors must generally be content to accept as a necessary evil until they find it imperative to call for more searching enquiry into the conduct of affairs than that of mere audit. In the case of the Yeoland Consols "mining" operations, so called, the shareholders were informed by the directors a year ago that difficulties in their way, such as bad weather, &c., had at last been overcome, and that three months would suffice for applying the water-power ready to hand, or at least for such provisional application of steam-power as would place the tinstuff, stated to be ready in large quantities, rapidly upon the market.

So much for promise, now for performance. The work reported to have been done with the shareholders' money during the past 12 months amounts to the lengthening of a small adit by 20 fms., the walling in of a wheel-pit, and the preparation for sale of some 5 tons of ore with plant, which the shareholders were told had duly become their property a year ago. Such extensive operations have,

the shareholders are expected to believe, entailed an outlay of some 2830*l.*, including, of course, what the directors imagine they will be permitted to appropriate in the shape of fees.

The statement of accounts accompanying the report now issued to the shareholders does not make it clear whether their interests were affected by the refuge in bankruptcy taken by one of the directors of their "mining" operations.—*London, Feb.* 5. J. U. S.

## HOW TO PROMOTE LEGITIMATE MINING.

SIR,—Owing to the heavy losses sustained through paying vendors and promoters such large sums for their properties, before being fairly proved, I would propose that two years' trial be made before paying the purchase consideration; then capitalists and investors would have the satisfaction of knowing their money would be used legitimately for mining. In order to put my proposal into practice a syndicate is being formed to purchase leases of known rich mineral properties on the above conditions.—*Feb.* 8. J. F.

## WHEAL BENNY.

SIR,—The paragraph which appeared in the Journal of Jan. 26 is totally false and misleading with regard to this mine. No new ground whatever has been acquired extending towards Devon Great Consols beyond the old boundary, or can be acquired, as the whole is taken up in the setts of East Wheal Benny and West Wheal Williams, which are now, and have been some time, entirely in my hands. We have Wheal Benny lode running entirely through this sett for 400 fms., while Wheal Benny cannot have it much more than half that distance. Most likely in this matter, as in many others, "the wish is father to the thought;" as an extension of their sett in this direction is a matter for them greatly to be desired, as a development of Wheal Benny would seem to indicate that this district, between Hingston Down and Devon Consols is really teeming with wealth, and is entirely virgin ground. Verily the Devon Consols people seem to have been sleeping with an Eastern Dolcoath close to their nose!—*Calstock, Feb.* 4. H. REYNOLDS.

## HERODSFOOT MINE.

SIR,—In the statement of accounts presented at the meeting on Friday last I see an amount of 2950*l.* 17*s.* due to bankers, being an overdraft of 950*l.* 17*s.* It would be some degree of satisfaction to the shareholders to know who authorised this overdraw, when 2000*l.* was the full amount guaranteed at a general meeting. I doubt if the shareholders are liable for this overdraft, and the committee should be held responsible, or those who sanctioned this excess of the amount authorised.—*Liskeard, Feb.* 7. S.

## EAST WHEAL ROSE MINE.

SIR,—Your correspondent "K. D." of Jan. 26 appears to have committed the greatest error in supposing this mine ceased working on account of the inundation by the waterspout, as the mine was again completely drained in less than three months from the date of the accident, and worked by the same company for seven years after successively and made good profits; at the expiration of which this mine was purchased and worked by another company, and a change of management for two years at a loss of about 15,000*l.*, and was finally suspended and wound up for lack of produce. If the present Limited Liability company should ever be fortunate enough to drain the bottom of the mine, which I very much doubt, they will find it exceedingly poor, with the kernel gone and nothing but the shell remaining. One locally acquainted with the mine, and the low price of lead, the condition of the bottom levels and the heavy amount of water charges to contend with, must have known that a worse selection for the investment of capital could not have been made out of all the knacked bals in Cornwall.—*Jan.* 31. W. B. M.

## THE ST. AGNES DISTRICT

SIR,—It will be remembered by readers of the *Mining Journal* that I called attention to West Kitty when the shares were quoted at 40*s.* They are now several times that price, and paying dividends of at least 30*s.* per share per annum. The mine is paying large dividends, has an enormous amount of reserves, and the price at which tin can be returned is low. It is said that it can be produced at 25*l.* per ton, but is it not a fact than it can be produced for less than this amount. There is no mine that I know of improving at the rate West Kitty evidently is. Then there is Polberro, said to be the Queen of St. Agnes, or as it is known "The Royal Polberro." This mine will go in right royal fashion. It is marvellous that for so long a time so little has been done, but now the scene has changed.

*Cannon-street, Feb.* 7. THOMAS EARLY.

## POLCREBO TIN MINE.

SIR,—Since my letter of Jan. 24 I have found that the necessity is greater than ever for putting forward such facts as are calculated to inspire hope in connection with mining in the county. Many miners are likely to be thrown out of work owing to the depression which has doomed some of the great mines, in which thousands have been employed, which mines, owing to their great depth and other circumstances, are not in a position to continue paying profits, and the heavy calls to pay landlords and merchants are causing them to cease working at the deeper levels, and may cause the mines to close altogether.

The discovery, therefore, of rich tin lodes at and near the surface, workable at a profit from the adit downwards, is a boon to miners of the county as well as adventurers. Polcrebo Mine since I last wrote has opened out two or three additional points of great value—one in the 30 fm. level and another at the deepest point in the mine, at the bottom of Highburrow shaft, 40 fms. under the adit level, which has been just reached, and the pitwork fixed for pumping from the bottom, which admits of extending levels east and west upon the lode at that depth with almost a certainty of greater riches than is found at any other point. The lode east of Highburrow has greatly improved since first discovered; it is now more than 5 ft. wide, and the prospect is favourable to its continuing of equal or increased value to the boundary, as in that part it has been rich from the adit level.

This course of ore going to the boundary of the Polcrebo sett gives one of the finest opportunities that has presented itself for many years of opening out a mine that will rival Polcrebo and almost any other mine in the county, and that too without incurring the cost of pumping machinery. At this stage it is well to refer back to the former successful mining in the district, as laid down upon the plans of the surveyor of the county. This is the more necessary from the fact that it has been spoken of very indifferently as a mining locality. First, immediately in the same run, and nearly close to the sett of Polcrebo, we have the Crenver and Wheal Abraham, which gave a profit of 200,000*l.*; South Crenver, large returns; Great Work, with a profit of 200,000*l.*; Polladras Downs, 150,000*l.*; Truman's Lode, 100,000*l.*; Great Wheal Vor, 272,000*l.*; Wheal Metal, 100,000*l.*; Wheal Fortune, 250,000*l.*; and Wheal Worthy, large returns. Through want of skill or some other cause Polcrebo had been worked by one company after another with no good results. Very good levels had been driven at the 17 below adit and also at the 30 below adit for a considerable distance, and the engine-shaft had been sunk in good solid ground, but the main lode had not been seen by those who spent most of the money in doing the valuable work referred to, but it stood entire and worth from 15*l.* to 25*l.* per fathom about 5 ft. from the level that was driven, but the level was upon a very indifferent branch, and those who did this work thought no doubt they were quite right in giving the district an indifferent character, but although the main lode so called appears to be three lodes, almost joined together, there was no cross-cut driven to attempt to open something better than they had driven upon, and the mine was abandoned as unlikely to do any good. Subsequently a party got hold of it and speculated upon a cross-cut, and just 5 ft. from the side of the level there stood a lode worth 25*l.* per fathom; but although this party induced Messrs. Harvey and Co. to erect a steam-engine for pumping, the representations made to those gentlemen as to who constituted the company proving false they resolved to stop the mine and wind-up rather than proceed with parties who had proved themselves unworthy of belief.

At this stage the sett was brought under the notice of the present company, and the success that has been met with will compare favourably with any of those mines referred to above, and thus will be established a valuable tract of mineral ground full of tin and copper lodes, equal to those of any district in the county. Here then is the spot for new enterprise to employ many of the discharged miners, where they are likely to get remuneration for their labour, equal to what they would obtain by going out of the country. These lodes possess one great advantage over most—of being productive very near if not close to the surface. This must have been found the case by the old workers, who upon the eastern part of Polcrebo sunk a shaft for every 10 fms. in length upon the lode, sinking, as they did, ten shafts to the adit within a distance of a trifle over 100 fms.

On the north and to the south of the main Polcrebo lode there are several tin and copper lodes all more or less converging towards each other going east; two or three of these form a junction with the main lode within the limits of the sett, while according to the angle given by the surveyor others will unite further east. These facts are well worthy of notice, as past experience proves that such intersections or junctions are highly favourable to increased riches, and especially so in cases where the approach to each other is gradual, as shown on the plans, and in respect of an intersection or two already met with in driving east at Polcrebo.

In a future communication I purpose referring to the probable cause of many mines having recently drifted into their unfortunate position. It would surely be matter for lasting regret on the part of landlords if the late unfortunate event at Dolcoath should prove the commencement of stopping all deep mines in the county, as soon as a little additional capital is required to be spent upon speculative work.—*Feb.* 4. M. N.

[For remainder of Original Correspondence see this day's Journal.]

## REPORT FROM CORNWALL.

*Feb.* 7.—It is idle to attempt to account for the fluctuations of the Tin Market, if statistics are what they seem to be, and the only fact worth noting of which we are cognisant in Cornwall is, that the county is not at present sending so much tin into the market as is enquired for. In truth, so far as we in the West are concerned, demand has more than overtaken the supply; and yet, what are we the better for it? Of course, "manipulation" is suggested as the real cause of the contradiction between statistics and standards; but, then, it is undeniable that consumption is really growing, and sooner or later, therefore, whatever manipulation exists, must come to an end. This, of course, is hopeful; but, after what has transpired, it is possible that most persons will be influenced rather in their dealings by individual improvements, such as that at Tincroft, several of which are either reported or in immediate prospect.

An interesting and valuable discussion was initiated at the South Crofty account on Saturday with regard to the use of dynamite, Mr. Bailey having called attention to the fact that 718*l.* was owing for that explosive. It is very evident that the miners have taken very kindly to dynamite—too kindly in many instances, for there certainly has been very considerable waste in not a few of the mines. How this is to be prevented is a problem not very easy of solution. Capt. Josiah Thomas has found that charging the men 2*s.* per lb. for it has made no material difference in its consumption; and, under ordinary circumstances, one would have thought this a check sufficient. Of course, as the price of dynamite falls, the point becomes of less consequence, but there never can be a figure reached at which it will be absolutely unimportant; and Mr. Lanyon's complaint, therefore, continues of present application, and cannot be passed by. Perhaps the remedy will be in the direction indicated by some of the remarks of Capt. Thomas. Invaluable in some situations, specially in hard and wet ground, elsewhere the use of dynamite is not always attended with such advantage; and in ground of moderate hardness it can be better done without. Well, then, one step in the way of reform will be the absolute prohibition of its use in ground where the agents are satisfied that it cannot be economically employed.

Even at the risk of receiving ungracious criticism we must express our opinion that it is unwise and ill-considered to trammel remissions of dues with the conditions as to profits, such as has been made at South Crofty and elsewhere. Little short of a miracle will enable profits to be made during the 12 months for which the remission is granted, and if they were what would it be set in account against the enormous amount of calls adventurers have had to pay while dues were being exacted. We may depend upon it the sooner this dues system is fixed upon a basis of principle, and not one of hand-to-mouth compromise the better.

A very wise course was taken at New Cook's Kitchen account in leaving out of the credits 300*l.* worth of copper and tin ore at surface which was partially dressed. The amount is a small one, and we only refer to it by way of illustration of what has previously been read in this column concerning the crediting of unsold produce; and to point out that in strictness of accountancy it is quite as much an error to omit the parcel to the amount of its intrinsic value and the cost of the labour expended upon it, as it would have been to credit it to the full extent of its final market value. It is, as it stands, an absolutely *bona fide* asset. Why it was wise to leave it over to the next account needs no explanation. If our mine balances are to err at all let it be on the right side. Let adventurers always know the worst, and let difficulties be grappled with as they arise, not suffered to accumulate to dangerous proportions. The county has been taught a severe lesson, and this salutary action at New Cook's Kitchen, unimportant as it may appear, is one of the fruits.

## REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

*Feb.* 7.—The Coal Trade does not present any new features of importance this week. The demand alike for domestic and manufacturing sorts keeps much within the supply, and prices, except for furnace sorts, are without strength. For furnace coal quotation stand at 9*s.* 6*d.* to 10*s.* and 10*s.* 6*d.* per ton, according to locality where mined. A little more animation is this week observable in some departments of the pig-iron trade, yet the individual orders are not large. Competition from outside districts with South Staffordshire continues keen. Northampton pigs are 43*s.* to 44*s.*, and Derbyshires 45*s.* to 46*s.* per ton. Hematites are 57*s.* 6*d.* to 59*s.* per ton, while Staffordshire hot-blast pigs are 62*s.* 6*d.*, and cold-blast 82*s.* 6*d.* The manufactured iron trade does not show revival, yet the bar makers continue steadily employed, and some of them are busy. Specifications in the sheet trade are still wanted, so as to find more employment for the ironworkers. Galvanising sheets are priced at 7*l.* 10*s.* to 7*l.* 15*s.* for singles, working-up sheets at 10*l.*, and stamping sheets 13*l.* to 13*l* 10*s.* List firms, such as William Barrows and Sons, quote boiler-plates, 9*l.*; best ditto, 10*l.*; double best ditto, 11*l.*; and treble best ditto, 12*l.*

On Wednesday a meeting of the South Staffordshire Mines Drainage Commissioners was held in Wolverhampton, under the presidency of Mr. Walter Williams. It was resolved that a general drainage (surface) rate should be levied upon all occupiers of mines within the drainage area at the rate of 1*d.* per ton upon all minerals gotten during the past half-year. Last year's surface rate realised a total of 157,000*l.*, 8413*l.* of which was spent on permanent surface works. The Finance Committee were authorised to borrow 6000*l.* on the security of the Old Hill Mines Drainage Rate to carry on certain works. A report was read from Mr. Terry, engineer for the underground works, stating that since the starting of the Stow Heath engine the water had been lowered very considerably in different parts of the district, especially at Stow Heath, Neachells, Portobello, Bradley, Rough Hay, Moxley, and Bilston.

On Wednesday Mr. F. C. B. Sanisbury, of the Castle Hill Foundry, Newcastle-unde-Lyne, filed his petition. The liabilities are estimated at 17,000*l.*

The New North Staffordshire Coal and Iron Company (Limited) have suspended payment owing to the existing depression in the coal trade. The liabilities are over 100,000*l.*, but the assets are believed to be large. The colliery is one of the largest in the kingdom, employing about 1200 men, and turning out nearly 1000 tons of coal per week. The collieries, however, will be carried on with a view to the execution of large current contracts pending the arrangement of the company's affairs.

An interim dividend at the rate of 5 per cent. per annum, and payable on March 1, was declared by the directors of the Sandwell Park Colliery Company (Limited) at their meeting on Tuesday.

## TRADE OF THE TYNE AND WEAR.

*Feb.* 7.—The Tyne Commissioners have made a general report of the Trade of the Tyne for the past year, and the amount of the exports and imports must be considered as satisfactory. The aggregate imports amount to 1,700,000 tons, and the exports, including coal and coke to more than 10,250,000 tons, being an increase on the whole, compared with the previous year, of 5½ per cent. The most important exports are chemicals, &c., 297,000 tons; iron and steel, 161,300 tons; coal, coke, &c., 9,599,000 tons. This unparalleled shipment of coal and coke shows that the Tyne maintains the position it has so long occupied as the leading coal port in the world. The tonnage which cleared from the port outwards during the year was 6,289,352 tons, being an increase of nearly 5 per cent. over the tonnage of 1882. From the shipbuilding yards were launched 159 vessels, of a gross tonnage of 216,573 tons, or 27 vessels and 8167 tons more than in the previous year. During the year 547 vessels entered the Tyne for refuge. The new dock at Coble Dean, adjoining the Northumberland Dock, is expected to be opened in May next for traffic. This dock has a water area of 24 acres, a quay space of 2600 ft., and a depth of water on the sill of 30 ft. at high water spring tides. With the increase of facilities provided by the Commissioners for the shipping and commerce of the port a large accession of trade, and a further development of the various important industries of Tyneside may be looked for in the future.

The demand for steam coal continues good, and the collieries north of the Tyne are fairly employed. The late severe weather has also improved considerably the enquiry for house qualities. The demand for gas coals continue fair, but of course not so urgent as it has been. Negociations are in progress for large contracts for this coal for export. Bunker coal, nuts, and manufacturing coals have been quiet, owing to the dull state of the iron trade. On the Wear the collieries in some localities have not been fully employed during the past week. The demand for coke is also rather quiet, and considerable stocks are held at some of the large works. On the whole, however, the coal and coke trades may still be considered in a fairly healthy condition.

The question of the supply of house coal to London still occupies the attention of the Coal Trade Office in Newcastle. As we have often pointed out in this letter, the price received by the colliery owners for cargoes of coal on the Thames is very low, while the London merchants still keep up the price to the inhabitants of the great Metropolis. It is, therefore, concluded that the merchants who purchase the coal in bulk are reaping large profits: The only remedy for this state of matters appears to be the course already adopted by the Marquess of Londonderry, to establish depots and sell the coal direct to the consumers. The question is, however, we believe complicated in a manner which has not yet been noticed by the Press. It is stated that some of the London coal factors are partners in collieries here, and if this be correct the solution of this difficult problem must prove a more difficult matter than is generally supposed.

The feeling on Newcastle Quay and in the Newcastle Exchange on Saturday was extremely dull. The bad state of the shipping trade—which is proved by the fact that considerably over 100 vessels are laid up on the Tyne, Wear, and Tees—and the dull state of the iron shipbuilding trade, causes much apprehension; the general feeling certainly amongst commercial men is that a dull period has set in. Engineers and ironfounders, &c., are feeling the want of orders in advance, and enquiries. We do not, however, anticipate that this state of affairs will continue very long. The heavy losses of vessels at sea of late must cause an increased demand for steam-vessels shortly. At the present moment there is certainly a panic, and a great want of confidence in all branches of trade here; but this will it is hoped pass away in a short time. The shipments of coal and coke at the Tyne Dock and other principal shipping stations on the Tyne have been considerably below the average this week, and the shipments on the Wear have also been below the average; but this has been caused mainly by severe weather at sea. The failure of one of the shipbuilding firms at Sunderland is announced, and the general trade of that town is much depressed at present.

The Iron Trade here continues extremely dull, but there has been little change in the value of any kind of raw or manufactured iron. The Cleveland ironmasters' returns for January have been published. There were 118 furnaces in blast at the end of the month, or three less than last year; 40 furnaces out or damped down. The make of Cleveland pig iron during the month 159,653 tons, which is 2343 tons less than in December. The make of other kinds of iron 69,971. The total make of all kinds of iron during the month was 229,624 tons, against 232,666 tons in December. The shipments of iron continue good. On Tuesday at Middlesborough the iron market was well attended, and there was a better feeling. No. 3 was quoted at 37*s.* for the present month. The change is considered a satisfactory feature. Stocks have increased lately at the rate of about 33,000 tons a month, but this will be rectified when 18 furnaces are blown out. The prospects of the finished iron trade are bad at present, shipbuilding is falling off very much, and wages must come down. Most of the engine builders, founders, iron bridge builders, &c., are still fairly employed.

IMPROVED MACHINERY BELTING.—Messrs. G. Angus and Co., extensive leather and india-rubber merchants, &c., of Newcastle-on-Tyne, have just brought out a new machine belt on a novel principle. Leather machine belts are subject to a great amount of tear and wear when constructed on the old plan, and when worked only a limited period they are much liable to breakage. The new belt is constructed of small pieces of leather, and made exactly similar in manner to the old winding chains formerly used in pits in the South of England. They are leather links, in fact, connected by means of steel pins. By this simple and ingenious arrangement the belt is rendered much more flexible, and it will accommodate itself to the sharpest bend without injury; and it will, of course, wear much longer than belts constructed of strips of leather in the ordinary way. Another great advantage connected with it may also be pointed out. When a failure takes place in any part of it, new links can be inserted with the greatest facility, in the same manner as iron links are put into a chain constructed of that material. There is no doubt that this belt is a great improvement on those constructed on the old plan, and that it will be extensively adopted is pretty certain.

COXON'S IMPROVED GUIBAL VENTILATOR.—This machine has been noticed lately in the reports published in the Journal. Messrs. Black, Hawthorn, and Co., Gateshead, are sole licensees for the construction of the machine, which is expected to be a great improvement on the old Guibal fan. We will shortly give detailed particulars about it, and will only now mention that 72 per cent. of useful effect in the power employed is expected to be got out of it.

The Chemical Trade in these rivers continues very firm, with an improving tendency. Bleaching powder continues very firm at 9*l.* 7*s.* 6*d.*, and it is expected to go higher. Chemical makers have resolved to reduce the make of soda crystals, as the price of this class of chemicals has not been satisfactory of late, and this resolution has had the effect of raising the price of the article already. The system of restricting the make of articles in order to secure increased prices is likely to be thoroughly tested in this district. It is possible that it may be successful when applied to articles which are specially made in the district, but it is very doubtful that it would be successful if applied to articles produced in other countries and localities.

The Lead Trade is in a very depressed state, the price of lead being extremely low, consequently only good mines can exist at present. The Derwent Lead Mines in West Durham have been closed, partly caused by the low price of lead and partly on account of the veins getting poorer in depth. These mines have been worked for many generations, and a large number of men were employed. The late

proprietors worked the mines 40 years. Some years ago a number of Cornish miners were brought here, but all have now left, the works being entirely closed. The royalties of the mines and the plant, materials, &c., have been purchased by the executors of J. and E. Joicey, who are also owners of an extensive estate in the district, and there is no doubt that there still remains a large amount of mineral wealth, extending over an area of many miles, and should Messrs. Joicey not work the mines the field is, no doubt, worthy the attention of capitalists, as a permanent mining field of considerable magnitude might be established

## TRADE IN SOUTH WALES.

*Feb.* 7.—Shipments at the South Wales ports show a great falling off as compared with recent weeks, owing to the unfavourable weather. Cardiff sent away 114,010 tons foreign, and 11,735 coastwise; Newport, 31,926 tons foreign, and 8777 coastwise; Swansea, 12,077 tons foreign, and about 8000 coastwise. House coal is in slack demand, owing to the mild weather. Patent fuel maintains quotations, and business is satisfactory. The small steam coal trade is somewhat better. On Friday, Feb. 1, at the Angel Hotel, Cardiff, a meeting of the Monmouthshire and South Wales Collieries Association was held, under the presidency of Mr. Edward Jones (Verteg). There were also present:—Messrs. E. J. Grice, J. C. Colquhoun, Evan Lewis, W. Jones (Cyfarthfa), R. Bedlington, E. M. Hann (Powell Duffryn), A. Hood, W. T. Lewis, W. Simmons (solicitor), E. P. Martin, L. Tylor, W. W. Hood, J. Simpson, J. Baun, E. Coward, J. Kirkhouse, J. Bailey, J. Jones, L Evans, W. Jones (Great Western Colliery), and W. G. Dalziel (secretary). There was a general expression of sympathy with regard to the death of the late Mr. W. G. Cartwright, one of the trustees of the Association. Mr. Edward Jones (Verteg) was unanimously appointed to succeed him.

The whole of the miners employed at the Llantwit and Black Vein Colliery have resumed operations, the company having defrayed, in the majority of cases, the money due to them for work executed prior to the dispute.

The Iron and Steel Trades remain in much about the same condition. Newport shipped 5155 tons last week, and Cardiff 2170. Arrivals of iron ore are not large, and prices remain low. Cardiff received 4000 tons last week from Bilbao and other places; Newport, 3303 tons from Bilbao, and 5000 from other places.

Tin-plates are in better demand, but manufacturers will not accept orders under 16s., which speculators refuse to pay. A good trade could be done at 15s. 6d. to 15s. 9d., but manufacturers are in a position to refuse all orders at these prices. Another shilling per box is what is aimed at, and no doubt if sufficient firmness is shown, it will be obtained.

## REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

*Feb.* 7.—Lead seems to have reached a lower price than it has seen for a century and a-half, and a little further decrease in price must be disastrous, but it may be hoped that the Nemesis has now been reached, and that this year will see an upward tendency. It has happened unfortunately for the great work of the Flintshire "deep level" that just as it is ready to unwater some of the most important of the Flintshire mines the price of lead should be so low, but with a little time, and the reduction of rents and royalties, which the depression has necessitated, all will come right, and the utility and advantages of this great work will be made apparent.

The first quarry to which the electric light has been applied in this country is the extensive one of the Liverpool Corporation at Llanwddyn. This quarry, which is 300 yards long, is lighted effectually by three Siemens' lamps, and work can thus go on all the 24 hours.

With the recurring dulness in the Coal Trade it is doubtful if the colliers can get any advance in wages this spring.

In the Slate Trade it is hoped that with the spring of the year a revival will come, especially as tiles do not now seem to be so extensively used as they were two or three years ago.

The limestone quarries producing fluxing stone keep well employed, but in those depending upon the building trade and agriculture there is some amount of slackness.

The long missing link of the Cambrian Railway system—the last link—the short line from Pwllheli to Porthdinlleyn, is expected to be supplied. A Bill for its construction has been found to have complied with Standing Orders.

It is gratifying to note that some of the Carnarvonshire mines have lately been selling zinc ore at a good price, and the discovery of a massive lode of manganese is announced from the same county.

## REPORT FROM DERBYSHIRE AND YORKSHIRE.

*Feb.* 7.—Little or no change has taken place in the trade of Derbyshire and the West Riding since last notice. The result of the Conference held last week at Birmingham has shown the dullest of miners that there is no possibility of wages going up, so that the question is now shelved until such time as it will suit the paid leaders to bring it forward again to suit their own purposes. For the present the latter have gone on another tack, so as to divert attention from what is of most interest to the men—more money for the work done—so that the men are now asked to look to their political rights. For this purpose there will, no doubt, be more conferences with paid delegates. Last year, indeed, may be said to have been a year of miners' conferences, and most costly they were to the men, and all that was gained by them was the pleasure of the well-paid delegates, who, of course, look forward to them with no little interest, as they are specially got up for their delectation. However, the question now is one as to the reduction of miners' wages, which cannot be much longer delayed. At the collieries in Derbyshire the men at many of them are not working more than four days a week, and at some of them only three days.

The demand for house coal is still very quiet, and may be expected to continue so for the next four or five months. Prices, too, are lower than for a long time past, and Silkstone coal can now be purchased at the pits as low as 8s. or 8s. 6d. a ton. The business doing with the Metropolis is dull even for the time of year, even as regards such places as Clay Cross, Eckington, Grassmoor, &c. There is a movement on foot just now amongst the colliery owners in the North of England for the purpose of doing away with the intermediate manor merchant and selling direct, which would be of great advantage to the consumers, who would have their coal at a much less price than is charged by the merchants. Steam coal has gone off fairly all things considered, but the largest consumers are the producers who are also ironmakers and founders, and the railway companies. The distance of nearly all the collieries from a seaport prevents any great quantity being exported, although some two or three places are able to send to Hull. There are a few contracts for works in the Metropolis, but they are not of much consequence. The requirements of the gas companies become less, whilst there is no material improvement as regards coal for manufacturing purposes. The iron trade of Derbyshire has kept up well considering the depression which prevails at the leading centres, for there has been no falling off as regards production. The foundries are also fairly employed, whilst there is a steady output of machinery and mining plant.

In Sheffield several branches of the old staple trade of the town are quieter than they were at the close of last year, and the men in some cases are not fully employed. In table and pocket knives, even of the best quality, there is now less doing, whilst in inferior qualities business is even worse. Orders from America have not been equal to what they were at this season in former years, and there is every reason to believe that the tariff is now telling heavily against this class of goods. The home demand has not improved for steel material of any kind. The quietness in the shipbuilding yards, and at machine and other works has caused a falling off in the demand for files, edge, and tools of almost every description. The make of both Bessemer and crucible steel is much below what it was a short time since. Not much is being done in rails, in a great measure due to the rates charged by the railway companies for conveyance to any of the seaports; but a fair amount of business continues to be done in other descriptions of railway material, including springs, tyres, and axles.

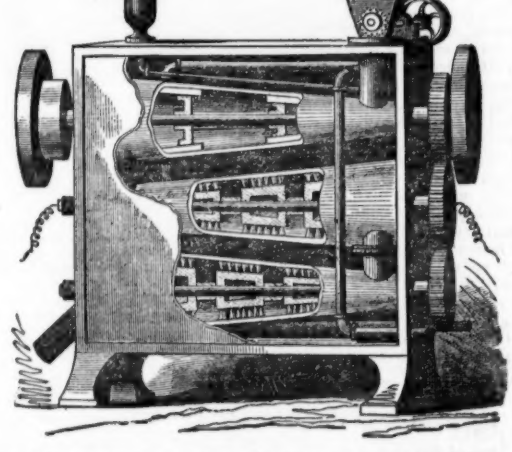
A considerable tonnage of Bessemer billets is now taken for the production of wire, a branch which is in a tolerably healthy state just now. Not so much is being done in heavy crucible steel castings, and some of the houses turning out steel wheels are not doing so much as towards the close of last year. The latest additions to Sheffield's specialities, the rolling of steel-faced armour-plates is now about the best trade in the town and district, although confined to two companies who have worked hard, and spent a great deal of time and money in bringing the plates as near to perfection as possible. The result is that they have distanced all competitors at home and abroad, and have as much as ever they can do in them for our own and other Governments. In other descriptions of plates a rather moderate business is being done.

Some fair orders, however, are in hand for hoop iron for exportation. The shears trade is beginning to look up, as well as some other kinds of light implements for agricultural purposes. Foundry material is in rather moderate request so far as regards light castings, such as ranges, stoves, grates, and the ordinary run of milder castings. The collieries in the district are mostly working short time, and all kinds of coal are much easier to buy than they were. Households move off somewhat slowly, while steam has declined in demand for exportation as well as for home purposes. A fair business is being done in coke, a good deal going to the ironworks in North Lincolnshire as well as to some in Derbyshire.

## NOVEL ELECTRO METALLURGICAL MACHINE.

Professor JAMES MANES and SONS call the attention of miners, mineowners, capitalists, and others interested in the working of gold or silver mines to their new Electro Metallurgical Machine for extracting fine and rusty gold from sands or tailings of stamp mills, or the sands of hydraulic gold diggings, or from the black sands on the coast of Oregon or California, and other parts of the world where gold is found.

The problem that has long troubled the worker of free-milling gold and silver ores is a method to save the mineral now lost in the tailings of stamp mills or flumes. This alone, if it could be saved, would amount to many million dollars profit each year, besides enabling the working of much territory which is now lying idle for want of an economical and thorough process of treatment.



Prof. James Manes and Sons, of Denver, Colorado, U.S., have invented a machine (represented in the above engraving) which it is claimed will save nearly the entire amount of mineral which passes through it, the loss not being over 10 per cent., and in many cases not in excess of half that amount. The machine is a cheap and practical process—it never need stop for charging or cleaning up, being nearly self-acting. Steam, electricity, and mercury are used in the process of extracting the mineral.

This machine or amalgamator is adapted for free-milling gold or silver ores, or refractory after roasting. It consists of a series of three or more large cylinders, wider at one end than the other, placed one above the other in a horizontal position, a shaft or spindle running through the centre of each.

The ore and mercury are fed into the first cylinder, passing into the second, and then to the third. The first cylinder is furnished with steel muliers which nearly touch the sides of the cylinder, and revolve at a good rate of speed, mixing the mercury and ore. The second cylinder is furnished with large steel brushes attached to the shaft or spindle, revolving at a high rate of speed; through this a current of electricity is furnished by a Westinghouse dynamic electro machine, which materially assists in gathering the particles of very fine gold together, and thoroughly amalgamating the metal and mercury. The third cylinder is similarly furnished to the second; into this the amalgam passes, and is again acted upon and mixed by the brushes to catch any gold which might have escaped amalgamation in the second. A fourth cylinder may be used if found necessary.

The amalgamated pulp then passes through a revolving copper drum, plated with quicksilver inside. As the drum revolves it takes up the most part of the amalgamated gold. As the inside of the drum is constantly washed with a spray of water from perforated pipes fixed inside of said drum, a clean-plated surface is constantly brought in contact with the pulp or tailings as it passes out from the cylinders. After leaving the drum it falls down on to incline copper plates, the same as is now used in stamp mills.

The amalgam can be collected from the drum and plates without stopping the machine, and any live quicksilver that passes will be caught in syphons. The tailings are carried off with the water. The machine when attached to the flume will be driven by the waste water; it sifts the fine sands from the coarse gravel, and amalgamates it as above.

The specific points claimed by Prof. Manes and Sons in their patent are—

1.—The saving of almost all the mineral passing through the machine.

2.—The loss being less than 10 per cent.

3.—The entire absence of loss of the amalgamated material, thereby saving all the mercury, which, with the processes now in use, there is a large loss both of mercury and the precious metal.

4.—The small cost per ton at which the ore can be treated.

By the addition of the powerful current of electricity that passes off the revolving brushes, the most minute particles of gold will be caught and retained, which in the ordinary flume and stamps passes off with the water; this often amounts to a large percentage.

The inventors state that if English stock companies will give their assistance to work the black sands of Oregon and California by paying for the building of the machines, they will take a share of the gold for their services, or they will send their machines to any part of the world, or will sell patent rights to those desiring any of their patent machines or revolving furnaces for roasting or smelting ores, ball pulverisers, &c.

Principal office of

PROF. MANES AND SONS,

No. 9, WINDSOR BLOCK, DENVER, COLORADO, U.S.A.

All our machines and furnaces are made by the Colorado Iron Company of Denver, Colorado, the most extensive mining machine works in America.

EMIGRATION TO NEW SOUTH WALES.—Almost simultaneously with the completion of arrangements for the conveyance of emigrants to Sydney by the magnificent steam vessels of the Orient line, the New South Wales Government have framed new emigration regulations, of which the leading features are as follows:—All emigrants must be selected by the Agent-General, or his representative in London, under instructions from the Colonial Secretary at Sydney. Selection to be limited to adult persons who can pay—men, 4*l.* each; women, 2*l.* each—towards cost of their passage; such selection to be made from the populations of England, Scotland, and Ireland, to prevent a preponderance from any of the three kingdoms, according to the Census returns of the colony for 1881; 10 per cent. of the emigrants may be natives of other European countries. Married persons not exceeding 40 years of age, children under three years of age in charge of parents free; children between three and 14 years at 1*l.* each. Unmarried men and women, not exceeding 35 years; these to be selected from the classes of mechanics, farmers, miners, vine-dressers, labourers, and domestic servants, with a special view to the industrial callings of the Colony. Any attempt at fraud causes the deposit to be forfeited. Intending emigrants above 40 years of age must pay 15*l.* for their passage.

## PROVINCIAL STOCK AND SHARE MARKETS.

CORNISH MINE SHARE MARKET.—Mr. S. J. DAVEY, mine share-dealer, Redruth (Feb. 7), writes:—Tincrofts and Carn Breas have been in good demand this week in our market, and there being an absence of sellers prices sharply advanced. Dolcoaths, East Pools, and West Kittys keep steady. To-day there is not much doing, owing chiefly to scarcity of sellers. Subjoined are the closing quotations:—Blue Hills, ¼ to ⅜; Carn Brea, 3 to 4; Cook's Kitchen, 9 to 11; Dolcoath, 60½ to 61½; East Pool, 35½ to 36½; Killifreth, ⅜ to ¾; New Cook's Kitchen, 2¾ to 3; New Kitty, 1¾ to 1⅞; South Condurrow, 9¼ to 9½; South Crofty, 2 to 3; South Frances, 5 to 5⅛; Tincroft, 4¾ to 5; West Basset, 1⅝ to 2; West Frances, 7 to 7⅛; West Kitty, 12⅜ to 12¾; West Polbreen, ⅜ to ⅞; West Seton, 2⅛ to 3⅛; Wheal Agar, 10½ to 11; Wheal Basset, 3 to 3⅛; Wheal Grenville, 5 to 5¼; Wheal Peevor, 2 to 2⅛; Wheal Kitty, ⅛ to ¾; Wheal Uny, ⅛ to ¾.

— Messrs. ABBOTT and WICKETT, stock and share brokers, Redruth (Feb. 7), write:—A better feeling has prevailed this week, and although tin has been dull there has been more disposition to buy shares in progressive mines. Dolcoath and East Pool are firm. Tincroft and Carn Brea show a material advance. Closing quotations herewith:—Blue Hills, ⅛ to ⅜; Carn Brea, 2¾ to 3; Cook's Kitchen, 8 to 9; Dolcoath, 61 to 61½; East Pool, 35½ to 36; Killifreth, ⅜ to ¾; Penhalls, ⅜ to ½; New Kitty, 1½ to 2; South Kitty, ⅜ to ⅝; South Crofty, 2 to 3; South Wheal Frances, 5¾ to 5¼; West Basset, 2 to 2¼; West Kitty, 12¼ to 12¾; West Frances, 7 to 7⅛; Wheal Agar, 10½ to 11⅛; Wheal Basset, 3 to 3⅛; Wheal Grenville, 4¾ to 5¼; Wheal Kitty (St. Agnes), ⅛ to ¾; Wheal Peevor, 1 to 1⅛; Wheal Uny, ⅛ to ¾; Tincroft, 4 to 5⅛; South Condurrow, 9 to 9½.

— Mr. M. W. BAWDEN, Liskeard (Feb. 7), writes:—The mining market is again dull. The present low price of shares offers but little inducement to buyers, from a want of confidence in the future of tin. The slight advance of last week has not been maintained, and without any apparent reason the standard has again receded. Subjoined are the closing quotations:—Bedford United, 1⅜ to 1½; Carn Brea, 2 to 2¼; Cook's Kitchen, 8 to 8¼; Dolcoath, 60 to 60½; Devon Consols, 3¼ to 4; Devon Great United, ¼ to ⅜; East Caradon, ⅛ to ¼; East Pool, 35½ to 36; Glasgow Caradon, ⅛ to ⅜; Gawton United, 2s. 6d. to 5s.; Gunnislake (Clitters), 1⅛ to 1¼; Hingston Down, 1s. to 1s. 6d.; Killifreth, ⅜ to ¾; Marke Valley, ¼ to ⅜; New West Caradon, 1s. to 1s. 6d.; Old Gunnislake, ⅛ to ¼; Phœnix United, 1 to 1⅛; Prince of Wales, ⅛ to ⅛; South Caradon (Limited) fully paid, ⅜ to ⅝; South Condurrow, 9 to 9¼; St. Just United, 4 to 4¼; South Crofty, 4 to 4⅛; South Devon United, ¼ to ⅜; South Frances, 5¼ to 5⅛; Tincroft, 3⅛ to 3¼; West Basset, 2 to 2¼; West Caradon, ⅛ to ¼; West Frances, 7 to 7¼; West Kitty, 12⅛ to 12¾; West Crebor, ⅛ to ¼; West Phœnix, ⅛ to ¼; West Mary Ann, ¼ to ⅜; West Seton, 2⅛ to 3; Wheal Agar, 11 to 11⅛; Wheal Basset, 3⅜ to 4; Wheal Crebor, 2 to 2¼; Wheal Grenville, 5 to 5¼; Wheal Kitty, ⅜ to ⅜; Wheal Jane, 2s. 6d. to 5s.; Wheal Peevor, 1 to 1⅛; Wheal Uny, ⅜ to ¾.

— Mr. JOHN CARTER, mine share dealer, Camborne (Feb. 7), writes:—There is more enquiry in the share market for low price shares. Tincrofts and Carn Breas have advanced from 4 to 4⅜ buyers, and the latter to 3. Subjoined are the closing quotations:—Carn Brea, 2¾ to 3¼; Cook's Kitchen, 8 to 10; Dolcoath, 61 to 61½; East Pool, 35⅛ to 36; Killifreth, 15s. to 17s.; Mellanear, 2 to 2⅛; New Cook's Kitchen, 2 to 2⅛; New Kitty, 1⅝ to 1⅞; South Condurrow, 9⅛ to 9¾; South Crofty, 2 to 2¼; South Frances, 5¼ to 5⅛; Tincroft, 4¾ to 5¼; West Basset, 2 to 2⅛; West Frances, 7⅛ to 8; West Kitty, 12⅛ to 13; West Seton, 2 to 2⅛; Wheal Agar, 10⅝ to 11; Wheal Basset, 3⅛ to 3¾; Wheal Grenville, 5 to 5⅛; Wheal Kitty, ⅛ to ¾; Wheal Uny, ⅛ to ¾.

MANCHESTER.— Messrs. JOSEPH R. and W. P. BAINES, share brokers, Queen's Chambers, Market-street (Feb. 7), write:—We have once more to record lower prices prevailing as a rule in the leading markets, the further depreciation being attributable to several and various causes, but all having the effect of helping the downward movement. The revelations in the case of the recent large failure have produced much uneasiness on the market. Railway traffics are unhealthy, and the advance in the Bank rate, all combine to restrict business and depress values, and the natural result has followed. Foreign funds, too, are dull; but the declines here are not severe, except in Egyptians, the fall of which is not to be wondered at in the present state of affairs in that country. Unified are 1⅝ to 2; Preference ⅜ to ⅝; and Daira Sanieh 1⅜ lower. Italians, Spanish, and Turks stamped, too, are little down, whilst Mexican Three per Cent. and Russians are each the turn better. Mexican railways have not had much attention, and with another large decrease in traffic, quite 1¼ down on the week. The total of business in miscellaneous investments is moderate, and indeed fairly good compared with the record for some weeks lately past; and prices, on the whole, show better figures marked in the majority of the alterations, but some of the classes are distinctly charged both for and against.

BANKS have a tolerably good show of transactions, prices realised being mostly well up to full rates lately obtained. Contrary to experience of this market for some time, the only changes in prices that have taken place are adverse, but in no case is the decline of great importance.—Lower: Bank of Liverpool, ¼ to ⅜; Manchester and Salford, ¼; and Union of Manchester, 1/16 to ⅛.

INSURANCE shares have changed hands to some little extent, but this market is far from active as regards dealings. The week, however, shows well in variations in prices, there being only one instance of fall, while there are many showing rise.—Higher: Royal Liverpool, ¼ to ⅜; Liverpool and London and Globe, ⅜; Manchester Underwriters, 1/16 to ⅛; Thames and Mersey Marine, 3/16 to ¼; Reliance Marine, 1/16 to ⅛; and Lancashire and Yorkshire Accidental, ⅛.—Lower: Manchester Fire, ¼.

COAL, IRON, &c., AND MINING.—This market is somewhat irregular, but altogether a better tone appears to be manifested. Transactions are few, the improvement in tone being noticeable only in quotations, the balance of movement being favourable. Pearson and Knowles, B, which marked such a big drop last week have been revised, and as a result a substantial rise on last week's figures is marked. Compared with last week they show 6 higher. Bolckows are contradictory, fully paid being lower and 12*l.* paid, higher; but both changes are fractional. Staveley A's are distinctly lower, being marked 2½ down. Ebbw Vales, A. Knowles and Sons, Cammels, Tredegar Coal, &c., A, and Parke Gate Iron are each a little higher, whilst Nant-y-Glo and Blaina Preference and Canadian Coppers are rather easier.

COTTON SPINNING, &c., shares dull and inclined towards ease. Some enquiry was manifested yesterday, when it was announced that the strike in East Lancashire was ended; but as this proves untrue little is going on again.

TELEGRAPHS again lower where changed, excepting a slight rise in West India and Panama. The only decline of importance, however, is in Anglo Prefs.——TELEPHONES.—Nationals, ¼ to 1 better; Lancashire and County, point lower.——CANALS.—Suez, Rochdale, and Lancaster all higher; others no change.——CORPORATION STOCKS, &c.—Blackburn and Bradford Debentures both show good advance. Manchester Stock buyers offer little more, otherwise without change.——MISCELLANEOUS.—Liverpool Storage ⅛ to ¼ better. Rylands ¼ easier.——RAILWAYS.—The unfortunate and disgraceful news made public at last settlement has caused uneasiness, which at times has almost amounted to panic, and English rails have suffered heavily in consequence, affairs being further aggravated by the poor traffics exhibiting slackness of trade, and to-day free selling brought down prices generally, some reductions being large. The close, however, is somewhat steadier. The advance of the Bank rate to 3½ has doubtless had some effect in the same direction. Canadians better all round; and though the traffic returned this morning was a total increase of 4031*l.*, no change of moment has occurred since opening. Americans in some cases firmer a little, but New York, Pennsylvania, and Ohio Firsts have gone heavy to-day on their November statement only showing $45,000 increase.

NEWCASTLE-ON-TYNE.—Mr. S. N. CHALLONER, stock and share broker, Grey-street (Feb. 7), write:—Barrow steel Ordinary remain 7½, and Six per Cent. Pref. at 9¼, at which business has been done to-day. Bolckow shares show a further improvement, fully-paid ¼, at 19½ to 19¾, and 12*l.* paid ¼, at 11 to 11¼. Consett Iron shares are not quite so firm, and at 21 ex div. are ½ lower. C. Cammell and Co. are ¾ higher, at 67¾ to 68¼. Ebbw Vale ¼, at 6¼ to 6½. Earle's Shipbuilding remain 11 to 15. John Brown's, 57⅛ to 58¼. Palmer, A, 26 to 26½; B, 16½ to 17; while West Cumberland Iron are ½ lower, at 7½. Sir W. G. Armstrong have recovered 5, at 125, buyers. North-Eastern Bank remains 6¼ to 6⅜. High Gosforth Parks at 15 show a recovery of 2. Lawes' Ordinary are without change, at 5¼ to 5⅞; and Preference at 10¾ to 10⅝. Sadler and Co. are ¼ lower, at 2¼ to 2½ prem. Newcastle Chemicals 2s. 6d., at 40s. to 42s. 6d. Rhymney Iron are 27s. 6d. to 30s.

## SCOTCH MINING AND INDUSTRIAL COMPANIES SHARE MARKETS.

STIRLING.—Mr. J. GRANT MACLEAN, stockbroker and ironbroker (Feb. 7), writes:—During the past week business has continued quiet, owing to the depressed state of general trade, some large failures, and the stiffer tendency of the money market. Although prices are very low there is a want of anything of a nature to encourage purchasers.

In shares of coal, iron, and steel companies prices are steady. Marbellas touched 75s. on the dividend announcement, but have since relapsed to about 70s. Cardiff and Swansea, 50s. to 60s.; Rhymney Iron, 37s. 6d. to 42s. 6d.; and West Cumberland, 7 to 7¼.

In shares of foreign copper concerns prices are steady. Tharsis have been sold from 6¾ to 6⅞. Arizonas have declined from 29s. to 25s. Belts are at 60s. Copiapo, 60s. to 65s.; Lake Superior, 2s. 6d. dis. to 2s. 6d. prem.; Panulcillo, 5⅛ to 5⅜; and Pierrefitte, 10s. to 12s. 6d.

In shares of home mines there is more business doing. The principal alteration is an advance in the East Rose group. Glasgow Caradons are also better at 6s. to 7s. North Penstruthal, South Penstruthal, Wye, and Herodsfoot all offered. Anderton are at 15s. to 17s. 6d.; Blaen Caelan, 5s. to 7s. 6d.; Camborne Vean, 2s. 3d.; Carn Camborne, 11s. to 13s.; Creigiog, 2s. 6d. to 5s.; Devon Great Consols, 75s. to 85s.; Devon Friendship, 1s. 6d. to 2s. 6d.; Drakewalls, 5s. to 7s. 6d.; East Van, 4s. to 6s.; East Wheal Rose, 8s. to 10s.; East Craven Moor, 1s. 3d.; Ecton, 30s. to 35s.; Great Laxey, 10; Gunnislake (Clitters), 20s. to 25s.; Killifreth, 15s. to 17s. 6d.; Lead Hills, 52s. 6d. to 57s. 6d.; Mellanear, 17s. 6d. to 22s. 6d.; Mounts Bay, 2s. to 3s.; New Terras, 5s. to 7s. 6d.; New Kitty, 35s. to 40s.; New Caradon, 2s. to 3s.; Old Shepherds, 14s. to 16s.; St. Just United, 40s. to 45s.; Sortridge, 1s. 6d. to 2s. 6d.; Tankerville, 1s. 3d. to 2s. 6d.; Tamar, 7s. 6d. to 10s.; Tregontrees, 1s. 3d.; West Phœnix, 2s. to 4s.; Wheal Basset, 60s. to 65s.; Wheal Grenville, 4¾ to 5¼; Wheal Jane, 1s. 6d.; and Wheal Peevor, 20s. to 25s.

In shares of gold and silver mines there has been less business doing. United Mexicans have declined from about 10⅝ to 9¾ on the profits being smaller. Kohinoors are firmer since the mill has been started. Chile Debentures wanted. Great Zaruma and Trojis are offered. Asia Minor are at 5s. to 7s. 6d.; Birdseye, 20s.; Consolidated, 1s. 6d.; Chontales, 2s. 6d. to 3s. 9d.; Cankim Bamoo, 7s. 6d. to 8s. 9d.; Flagstaff, 1s. 6d. to 2s. 6d.; Gold Coast, 5s. to 5s. 6d.; Guinea Coast, 4s. 3d.; Hoover Hill, 2s. to 3s.; Kapanga, 1s. 6d. to 2s. 6d.; La Plata, 4s. to 6s.; Montana, 40s. to 45s.; New Callao, 5s. to 7s. 6d.; Rhodes Reef, 9d. to 1s. 6d.; Rio Grande, A, 3s. 3d.; Tacquah, 3s. 3d.; Victoria, 14s. 6d. to 15s. 6d.; and West Callao, 8s. 9d. to 11s. 3d.

In shares of miscellaneous companies prices are steady. Home Mines Trust, 13s. 9d to 14s. 3d.; Lawes' Chemicals, 5⅜ to 5⅞; and Nobel's Explosives about 23¾.

EDINBURGH.—Messrs. THOS. MILLER and SONS, stock and share brokers, Princes-street (Feb. 6), write:—The past week has been a very dull one on the Stock Exchange. North British has receded from 103¾ to 103¼, Caledonian from 102½ to 101¾, Highland from 90½ to 89¾, Great North of Scotland from 52¼ to 52⅜. Preference and debenture stocks have found ready purchasers at improved prices. Arizona Copper have been weak, and they show a fall of 2s. Oil shares are not much changed. Broxburn have risen from 27 to 27⅛, Pumpherston from 30s. 6d. to 31s. 1d. Burntisland have declined from 22⅝ to 22; Dalmeny from 24 to 23⅝. Northern Assurance have receded from 43 to 41¾. Prairie Cattle shares show a rise of 1s. 3d. to 2s. 6d. per share on each issue.

## IRISH MINING AND MISCELLANEOUS COMPANIES SHARE MARKET.

CORK.—Messrs. J. H. CARROL and SONS, stock and share brokers, South Mall (Feb. 7), write:—Markets were rather irregular to-day. Great Southerns were easier at 120½ to 121, and Midlands at 82¾ to 83. Bandons were done at 84½, and Limericks at 23½ to 24. National Banks saw 24½, and Provincials at 31¾; Munsters, 6 9-16ths. No change in Hibernians. Alliance Gas were done at 18 13-16ths, and Cork Gas remain 8½. Dublin Trams, 7½, and Steam Packets sellers at 11¾. Gouldings were offered at 9, and Levys at 6½. Corporation Stock offered at 99¾, and Harbour Board, 110 to 111.

## FOREIGN MINING AND METALLURGY.

Spring is approaching little by little, and the winter is passing away in Belgium without any of the weather which coalowners regard as favourable to their interests. The period of the year has not yet arrived when prices begin to exhibit a downward tendency, as it is generally not before April that quotations show a change. Notwithstanding this, however, concessions are already being made here and there, especially by those producers who wish, at any cost, to maintain their extraction at its ordinary level. Other colliery proprietors have more prudently come to the conclusion that it is preferable to suspend their working operations one day or even two days per week rather than to make any reduction in their rates at present. This latter view predominates in the Centre and also in the Liége basin. Quotations are still fairly well maintained upon the Belgian coal markets; the greatest firmness is, perhaps, observable in the Couchant de Mons. The aspect of the German coal trade has experienced no material change. Prices have remained depressed for coke, but other products have been pretty well maintained. Coal for industrial establishments has been in less demand than it was a year since, but household coal has been in sufficient demand to secure an absorption of the current production. Gas coal appears to have also secured a more extended outlet, and its price has shown an upward tendency. The German coal markets may be said, however, to derive their principal strength from the export demand, especially so far as Westphalia is concerned.

The amount of business passing in the Belgian Iron Trade has been comparatively restricted. Complaints have become general, and if a revival does not shortly take place the consequences must be serious. Some specialities are still selling pretty well, and it is upon these that Belgian industrials most principally base their hopes as regards the future. The best descriptions of pig, for instance, are currently disposed of without any stocks accumulating; stocks of secondary pig are being formed, on the contrary, to rather a serious extent. In a similar manner girders and plates are disposed of with considerable difficulty when they do not recommend themselves by special manufacture or special qualities. The Charleroi district is rather seriously affected by the difficulties of the moment, and several of the rolling-mills are now idle for one or two days in each week, while a fresh reduction of 10 per cent. has been made in the wages of their workpeople, making a fall of no less than 20 per cent. in wages during the last few months. The construction workshops have nearly exhausted their old orders, and have to look out for fresh contracts; some fresh business is stated to have been already secured, and more is in course of negociation. The Belgian Government has decided to send some engineers to England to study the question of the metallic infrastructure of railways. No. 3 plates have made 7*l.* 4s. per ton in Belgium, while plates of commerce have brought 8*l.* 16s. per ton.

The condition of the French iron trade is still far from brilliant; and, although a recent meeting of forgemasters in the Nord stoutly refused to make any reduction in iron quotations, it is none the less true that business has been done in iron at Paris at 6*l.* 8s. per ton, which is equivalent to 5*l.* 16s. per ton at the forges; indeed, to contend with forges in the immediate neighbourhood of Paris, forgemasters of the Nord would have to effect sales at 5*l.* 12s. per ton. Steel rails have shown depression upon the French markets, prices being affected by recent contracts. In the course of last year 330,000 tons of pig and cast iron were imported into France; 70,000 tons of iron and about 42,000 tons of steel of every description were also imported into France in the same period. Upon the whole, 1883 is considered to have been not a bad year for the French iron trade, but the last few months brought with them a sensible reduction in prices. Two colossal dredgers, capable of raising 5000 cubic metres of "stuff" in 10 hours, have just been completed at Lyons; they are intended to be employed upon the Corinth Canal. The aspect of the German iron trade has experienced no material change; the general tone is one of depression. Pig has been especially neglected, with the exception of spiegel pig. The proprietors of rolling-mills in Germany are complaining a good deal of low prices and insufficient orders. The German steel works have received some fresh orders.

NOBEL'S EXPLOSIVES COMPANY—TESTIMONIAL TO MR. CUTHBERT.—The officials and others connected with this concern met in the company's board room in Glasgow, on Feb. 1, for the purpose of presenting Mr. A. A. Cuthbert with a testimonial of their respect and esteem on the occasion of his resignation of the post of manager of the company, which he had held for the past nine years. Mr. W. Hill Thomson, the secretary of the company, presided, and Mr. Thos. Johnston, Mr. Cuthbert's successor, in a few graceful remarks made the presentation, which consisted of a handsome marble dining-room timepiece with ornaments to match, and also a couple of drawing-room candelebra, the articles bearing the following inscription:—"Presented to Alexander A. Cuthbert, Esq., by the officials, instructors, and ship captains in the service of Nobel's Explosives Company (Limited) as a token of their esteem on the occasion of his retiral from the management of the company. Glasgow, 31st January, 1884." Mr. Cuthbert replied in suitable terms.

GARNETS IN AUSTRALIA.—Among the gems in which New South Wales is so rich is the garnet, of which the most frequent is the alumina-lime or common garnet which is generally met with in the granite ranges, as at Hartley. It is found also at Bingera, Pond's Creek, and other places near Inverell; at Uralla, in a talc schist at Bathurst, Trankey Creek, and Coombing Creek Copper Mine; with mica schist in Washpool Creek; on the Abercrombie river; on the Old Trigomon, Moama river, four miles west of Jillamalong Hill, with hyacinth and gold; and at Hardwicke, near Yass. Red translucent garnets are found at Guigong and in Sidmouth Valley. The garnets from Duckmaloi are dull brown and crystallised in combinations of the rhombic dodekahedron and ikositetrahedron, with large irregular crystals of epidote, in association with wollastonite in schist. A dark greenish-brown garnet occurring in large quantities with magnetic iron ore is found at Wallerawang, well crystallised in rhombic dodekahedra. Small colourless crystals and massive garnet with a variety of diallage or bronzite occur near Tamworth. Small brown garnets crystallised in rhombic dodekahedra occur in a mica schist near Sofala. Garnets are also found associated with magnetite at Wallerawang. They are of a brown colour, rather dull.

## THE COAL TRADE.

Mr. J. R. Scott, the Registrar of the London Coal Market, has published the following statistics of imports of coals into the port and district of London, by sea, railway, and canal, during Jan., 1884:—

IMPORTS.

| By Sea. | Ships. | Tons. | By Railway and Canal. | Tons | cwt |
|---|---|---|---|---|---|
| Newcastle | 238 | 239,676 | Lond. & North-Western | 123,989 | 15 |
| Sunderland | 114 | 99,363 | Great Northern | 104,783 | |
| Seaham | 29 | 19,522 | Great Western | 84,703 | 0 |
| Hartlepool | 45 | 21,824 | Midland | 186,091 | 0 |
| Middlesborough | — | — | Great Eastern | 62,994 | 2 |
| Scotch | 9 | 3,283 | South-Western | 5,372 | 14 |
| Welsh | 29 | 27,315 | London, Chat., & Dover | 10 | 0 |
| Yorkshire | 27 | 5,709 | London, Til., & South. | — | — |
| Cumberland | — | — | South-Eastern | 1,752 | 0 |
| Duff | — | — | London, Brighton, &c. | — | — |
| Small coal | 8 | 2,816 | Grand Junction Canal | 853 | 5 |
| Cinders | 5 | 348 | | | |
| Colonial | — | — | | | |
| Culm | — | — | | | |
| Total | 504 | 419,946 | Total | 570,538 | 16 |
| Imports—1883 | 483 | 422,322 | Imports—1883 | 556,865 | 5 |

EXPORTS.

| | | |
|---|---|---|
| Railway-borne coal passing "in transitu" through district | Tons | 92,043 |
| Sea-borne coal exported to British Possessions, or to foreign parts, or to the coast | 97,835 | |
| Ditto sent beyond limits by railway | 21,595 | |
| Ditto by canal and inland navigation | 1,1 3= | 120,534 |
| Railway-borne coal exported to British Possessions, or to foreign parts, or the coast | 46,758 | |
| Ditto, by rail beyond district | — | |
| Ditto, by canal and inland navigation | 95= | 46,853 |
| Sea-borne coal brought into port, & exported in same ships | | 905 |
| Total quantity of coal conveyed beyond limits of coal duty district during January, 1884 | | 260,335 |
| Ditto, during January, 1883 | | 248,536 |

*General Statement, 1882 and 1884.*

| | | |
|---|---|---|
| Increase in coals exported during present year | | 11,799 |
| Increase in coals imported by railway and canal | 11,673 | |
| Less decrease in ditto, seaborne | 2,368 | |
| Deduct net increase in imports | | 9,267 |
| Total increase in trade within the London district during present year | | 2,512 |

## THE TIN TRADE.

Messrs. STRAUSS and Co. (London, Jan. 31) issue the following Statistics of Tin:—

| | Dec. 31, 1883. | Jan. 31, 1884. | Jan. 31, 1883. |
|---|---|---|---|
| Straits and Australian, spot.....Tons | 4,748 | 5,508 | 4,598 |
| ,, ,, landing | 921 | 569 | 1,041 |
| Straits, afloat | 1,535 | 1,575 | 928 |
| Australian afloat | 1,950 | 1,237 | 1,288 |
| Banca, on warrants | 849 | 1,271 | 1,363 |
| Billiton, spot | 1,766 | 1,501 | 2,300 |
| ,, afloat | 1,165 | 919 | 887 |
| Australian tin in Holland | — | — | 5 |
| Stocks in America, including quantity afloat | 3,360 | 2,980 | 3,650 |
| Total | 16,334 | 15,560 | 16,063 |
| Prices of Straits and Australian | £86 0 | £84 0 | £92 0 |
| Deliveries during month in London | 1,246 | 1,517 | 1,257 |
| ,, ,, ,, Holland | 624 | 529 | 325 |
| Total | 1,870 | 2,046 | 1,582 |

Shipments during the month from Straits to London 1175 tons, from Australia to London 550 tons, from London and Holland to America 520 tons, from Straits to America 150 tons; from Australia to America, 50 tons. Banca in Trading Company's hands and afloat, 2458 tons.

## THE COPPER TRADE.

Messrs. HENRY R. MERTON and Co. (Leadenhall-street, Jan. 31), issue the following Statistics of Copper:—

| Stocks in England and France and afloat thereto:— | 1884. |
|---|---|
| Chili bars, Liverpool and Swansea.....Tons | 25,574 |
| Chili ingots, Liverpool and Swansea | 139 |
| Chili ores and regulus, Liverpool and Swansea (fine) | 2,585 |
| Other stuff, Liverpool and Swansea (fine) | 4,281 |
| London, Foreign copper (chiefly Australian) and Landing | 3,318 |
| Havre and Bordeaux, Chilian and other bars | 2,320 |
| Havre and Bordeaux, other copper | 770 |
| Afloat from Chili (advised by mail and cable): | |
| Ores and regulus (fine) | 2,918 |
| Bars and ingots | 5,800 |
| Afloat from Australia (advised by mail and cable):— | |
| Fine copper | 1000 |
| Total | 47,345 |

Price of Chili bars, 56*l.* 10s. per ton.

COPPER.—Messrs. JAMES LEWIS and SON (Feb. 1) write:—On Jan. 1 the charters were announced as 1300 tons fine, and sales of Chili bars were made at 55*l.* for cash and 56*l.* 12s. 6d. for three months, but subsequently the market became weaker and unsettled, and values gradually declined to 56*l.* 15s. sharp cash on the 7th inst. From this point there was a reaction to 57*l.* 10s. sharp, and 57*l.* 15s. usual cash, followed by a fall to 55*l.* 17s. 6d. cash, and again by a rise to 57*l.* 12s. 6d. sharp cash, and 58*l.* 5s. three months. On Jan. 16 the charters were cabled as 1500 tons fine, and the cost of Chili bars in Valparaiso 15s. per ton lower. Bars were in consequence offered more freely and declined 2*l.* per ton, to 55*l.* 17s. 6d. sharp cash and 58*l.* 10s. three months. About 500 tons of bars being purchased at these low prices, and a considerably quantity of furnace material being taken by smelters, the market improved and the stocks made up yesterday showing a material reduction with large deliveries, it closes firm with Chili bars at 56*l.* 12s. sharp cash, 58*l.* 15s. usual 14 days and brokerage, and 57*l.* 5s. for delivery in three months time. The charters are today advised as 1300 tons fine. Smelters and manufacturers of India sheets now decline to take further orders for delivery before April, and should the market for bars and furnace material advance further we may see an active demand to cover the forward sales made both by them and speculators. We look for a considerable diminution in the arrivals of copper produce from the Western States of America during the next six months, as the long winter there, lasting until June, interferes greatly with the shipment of ore and also with smelting operations.

## SOCIETY OF ENGINEERS.

The distribution of premiums of books awarded for papers read during 1883 formed the leading feature of the meeting of the Society of Engineers on Monday, when Mr. JABEZ CHURCH, M.I.C.E., F.G.S., the President for that year, made the presentation. The recipients were—Mr. George Bower, for his paper "On the Bower-Barff Process of Preserving and Ornamenting Iron and Steel Surfaces;" Mr. Chris. Anderson, for his paper "On the Feasibility and Construction of Deep Sea Lighthouses;" and Mr. Hamilton W. Pendred, for his paper "On Designs, Specifications, and Inspection of Ironwork." Mr. Church announced that Lady Siemens had kindly presented to the Society 70 volumes on engineering subjects from the library of her late husband, Sir William Siemens, in remembrance of his long connection with the Society of Engineers.

The inaugural address of the new President for the present year (Mr. Arthur Rigg) was then delivered. After referring to the work of the past session, and stating that the short educational courses of lectures commenced during the last President's term of office showed the interest taken by the Society in the education of engineers, the speaker referred to the extended cosmopolitan characteristics of engineering at the present time, and showed how it now embraced subjects so widely separated as the constitution of matter and the dynamical relationships of the heavenly bodies, and how chemistry and other sciences are now intimately related to engineering. Tracing the progress of engineering education in England, from the great movement in Lancashire in 1839, which resulted in the establishment at Chester (under the late Rev. Arthur Rigg) of what developed into the first engineering school in England, the speaker next showed how the superior technical training of continental schools had influenced the English system, and how now the City Guilds were as concerned to make trade secrets generally known as their predecessors were concerned to keep them in the knowledge of few.

Regarding the older classical system, it was stated to have produced a higher order of men, endowed with more real wisdom than any mere technical training can supply; and the conclusion was reached that it would be far better to engraft technical education on the well-tried system of our ancestors, as this would be better suited to English temperament than slavishly copying a continental method, too often destructive both of originality and genius. In illustration of the all-embracing character of modern engineering, the four substances, oxygen, hydrogen, carbon, and iron were passed in review, and some of their extraordinary physical and chemical characteristics were pointed out. It was also shown how easily the engineer, in carrying out his design, can bend the "inflexible" laws of Nature to his varied requirements, simply by regulating the conditions under which they operate; how the electrical properties of iron now under investigation are revealing secrets related to its inner constitution; and, perhaps, to the anatomy of all matters. The President remarked on theories, that they are the only guiding lights by which we can penetrate the gloom of all that is unknown, and that their value is only so far as they attain this end. The theorist deserves our gratitude, and may not be blamed if his ideas become shattered in the dust for others of wider scope and more general application. Nor can we wonder at the mistakes of science in its greater generalisations, when it is so profoundly ignorant of things open to its view on every side. If, then, such things are so, it is surely better than a great collection of undigested knowledge, to possess more of wisdom to apply such facts as we really know to practical account.

## Registration of New Companies.

The following joint-stock companies have been duly registered:—

ROWLEYBURN LEAD MINE COMPANY (Limited).—Capital 10,000*l.*, in shares of 1*l.* To purchase Rowley Head, Hexham, Northumberland, known as Rowley Head Mine, and to work same. The subscribers (who take one share each) are—J. Snowhall, Hexham; J. J. Foster, Dilston Mill, Northumberland; J. Miller, Hexham; J. Cooke, Backstreet, Hexham; E. Riddell, Gilesgate, Hexham; W. M. Smith, Hexham; H. Richley, Coleridge.

OURO PRETO GOLD MINES OF BRAZIL (Limited).—Capital 400,000*l.*, in shares of 5*l.* To acquire all the mineral property known as the gold mining estates of Raposos, Espirito Santo, Borges, and Passagem, in the province of Minas Geraes, in the Empire of Brazil, and to carry on in South America, or in Great Britain, the business of winning and working gold, &c. The subscribers (who take 100 shares each) are—E. Pontifex, 89, Lancaster Gate; M. H. Belloc, 78, Rue de Courcelles, Paris; Le Marquis de Faletans, Chateau de Faletans (Jura), France; R. Ward, 21, Onslow-square; Comte Gostan de Scey, Dôle, France; J. Taylor, 6, Queen-street-place; R. Taylor, 6, Queen-street-place.

MACHINERY EXCHANGE COMPANY (Limited).—Capital 20,000*l.*, in shares of 5*l.* To carry on the business of merchants, machinery and general brokers, agents, and valuers. The subscribers (who take one share each) are—T. Holt, Molesworth-street, Rochdale; T. Haughton, Summer Castle, Rochdale; J. H. Haughton, Entwistle-road; J. H. Gray, Summer Castle; V. Birch, Livesey-street; J. Holt, Albion-street; John Hamer, Rochdale.

MOABAUD TEA COMPANY (Limited).—Capital 40,000*l.*, in shares of 1*l.* For the sale and purchase of gardens, lands, and tea plantations or gardens known as Moabaud Estate, situated in the province of Assam, in the East Indies. The subscribers (who take one share each) are—A. Thompson, 38, Mincing-lane; R. J. Boyle, Spencer-road, Putney; S. Ward, 93, Cannon-street; W. H. Bennett, 7, East India-avenue; E. Tye, 14, St. Mary Axe; R. B. Magor, East India-avenue: R. Lyell, 7, East India-avenue.

EAST INDIA TRAMWAY COMPANY (Limited).—Capital 150,000*l.*, in shares of 10*l.* To construct, purchase, or take on lease any tramway or railway in India. The subscribers are—J. Percy Leith, 8, Dorset-square; C. Steer, Brent Hall, Hertfordshire; W. J. Gordon, major, 12, Montague-street; J. Brimton, 13, Great George-street; Alex. F. Baillie, 9, New Broad-street; W. H. Adams, Peckham-grove, Camberwell; F. P. Shuckard, Dailey-villas.

HEN AND CHICKENS ARCADE COMPANY (Limited).—Capital 50,000*l.*, in shares of 5*l.* To acquire from the Birmingham Aquarium Company the restaurant and property known as the Hen and Chickens property and to carry on business as hotel and restaurant. The subscribers (who take one share each) are—J. Deykin, Edgbaston, S. B. Whitfield, Broad-street; G. Hemming, Bristol-road; J. Wilson, Great Charles-street; A. A. Corder, Waterloo-street; W. J. Lewis, Waterloo-street; S. Tristone, Gravelly Hill, Erdington.

CROMER HALL ESTATE BUILDING AND INVESTMENT COMPANY (Limited).—Capital 50,000*l.*, in shares of 5*l.* To purchase freeholds, copyhold, leasehold lands, erect buildings thereon, or otherwise lease same. The subscribers are—W. F. Ingram, 65, Cromwell-road, 100; J. B. Werner, Lawn Hall, Loughborough, 100; S. Rostron, Hare-court, Temple, 100; Charles Ingram, Onslow Gardens, 1; W. D. Makinson Litter, 4, Temple Gardens, 1; Alex. J. Macdonald, Suffolk-terrace, 1; F. A. K. Bennett, Brick-court, 1.

VINTON AND CO. (Limited).—Capital 15,000*l.* in shares of 10*l.* To take over and purchase from Cassell and Co. (Limited) the copyright, goodwill, type, &c., used in printing the newspaper Live Stock Journal and Fanciers Gazette and Almanac. The subscribers are—W. Gilby, Pantheon, Oxford-street, 450, J. Thurton, 7, Princes-street, 450; J. Macdonald, Hampstead-road, 5; J. Sinclair, Hampstead-road, 1; E. Truelove, Princes-street, 1; H. A. Blyth, Pantheon, Oxford-street, 1; H. G. Blyth, Pantheon, Oxford-street, 1; A. G. Blyth, Pantheon, Oxford-street, 1.

COLONIAL IRON ORES.—The iron ores of New South Wales are among the richest in the world, the deposits being numerous and practically inexhaustible; but the colonial iron industries are as yet of limited extent in consequence of the comparatively small amount of capital expended in their development.

BANKRUPTCY JOURNAL.—There can be no question that this periodical will prove of considerable value to men of business generally, and especially to those giving large credit. The current number, that for Jan. 30, contains the new County Court Rules, much valuable general news, and a series of reports of first meetings, will prove of inestimable utility to creditors. It appears that one man, apparently a German, commenced business with 125*l.* capital, and in three months drew out more than he put in, expending 800*l.* in household furniture, &c., in 14 months, when he became bankrupt. The Bankruptcy Journal is well-arranged, ably edited, and contains such details as will render it useful to commercial men generally.

ROUGH ASHLAR.—Our esteemed Adelaide Correspondent—Mr. J. B. Austin—has enlarged his Rough Ashlar from December. He is evidently performing much useful service for the Freemasons of that colony, and greatly facilitating the formation of independent Grand Lodges in Australia by enabling members of the body to discuss the manner in which independent Grand Lodges have previously been formed. In the new organisation he should certainly be given a prominent official position. The Rough Ashlar should be heartily supported by every craftsman in South Australia, under whichever constitution he may hail, and whether the Grand Lodge movement be successful or otherwise.

KEROSENE SHALE IN AUSTRALIA.—The kerosene shale industry is of comparative recent introduction in New South Wales, although most extensive deposits of this valuable mineral have been found in the Colony. It was met with over half a century ago, its occurrence, near Bathurst, being mentioned in a book entitled Two Years in New South Wales, written by P. Cunningham, surgeon, R.N., published in London in 1827. He says—"A singular species of coal has been found at Bathurst resembling in some degree the Scotch Cannel coal * * * being nearly as light, and breaking with a similar fracture, while it burns almost with the steady brightness of a candle." However, like many similar discoveries of a later date, it remained unutilised until 1865, when a sample of oil distilled from some shale was exhibited. The shale is found among other places at Hartley, Blackheath, Bathgate, near Wallerawang; Milalong, on the Cox river; Mount Megalon and Mount York, county of Cook; Stony Creek, county of Wynyard; Joadja Creek, Berrima, Mount Kembla, Saddle-back, Cambewarra Ranges, Broughton Creek and Toonalli river, Burragorang, county of Camden; Lake Macquarie and Greta, county Northumberland; and Colley Creek, near Murrurundi. It is also said to occur as a 7-foot seam at a spot some 13 miles N.E. of Parkes, in the county of Ashburnham.

## SAFETY LAMPS FOR MINES.

The usual monthly meeting of the Manchester Geological Society, held on Tuesday, at Manchester, was occupied solely in the reading and discussion of papers on Safety-lamps for Mines. Mr. E. PILKINGTON, of the Clifton and Kearsley Coal Company, the President, occupied the chair, and as the question of safety-lamps has for some time occupied a great deal of attention in the district, there was a large attendance of mining engineers and representatives of collieries throughout the Lancashire coal field.

Mr. JOSEPH DICKINSON, H.M. Chief Inspector of Mines, read a short paper in continuation of one he had previously contributed on the Marsaut safety-lamp. In his previous paper, Mr. Dickinson pointed out the advantages claimed for the Marsaut lamp, and it was at first his intention to wait for discussion, but events had been hurried on by the want of a kind of lamp like the Marsaut, which would form a happy medium between the Davy and the Mueseler, in a colliery where the Davy had apparently failed, and the Mueseler was objected to on account of the difficulty of keeping it lighted in such a thin seam. Having only the statements, with such observations and experiments as were available without a proper testing apparatus, he could not take the responsibility of sanctioning the change unless fully satisfied of its security. He, therefore, lost no time in availing himself of the kindness of Mr. J. T. Green, of Celynen, to have the lamp tested with quick and varying currents of an explosive mixture. Those tests proved that the lamp certainly went out in an explosive mixture, but also that after the lamp went out gas continued to burn inside the gauze. Various methods were tried until it was found that, by closing the side inlets and lessening the size of the inlet and outlet apertures, the lamp became entirely self-extinguishing. In this modified form lamps had been made, and were now being worked with in the colliery alluded to, the result being, so far as it had yet come under his notice, that they suited the men in the working places; but being more liable than the original Marsaut to go out when tilted, they were not liked for travelling with. Having sent a copy of his paper to Mr. Marsaut, that gentleman had favoured him with his views to the following effect:—Mr. Marsaut stated that at the commencement of his experiments he thought the continuance of gas burning inside the gauze, after the lamp had gone out, was dangerous, or at least that it would be better if got rid of; and the idea of restricting the apertures in order to obtain complete extinction occurred to him, but finding that he could not accomplish complete extinction without sacrificing essential qualities of the lamp, he concluded, before making such a sacrifice, that it should be shown that this continued burning of the gas inside the gauze constituted any real danger. Mr. Marsaut considered that a relatively large quantity of air and gas was requisite to maintain the flame of the lamp and to coil the gauzes and other parts; and that the shield, under all circumstances, had the effect of placing the lamp as if it were in the midst of a quiescent inflammable mixture, in which situation, as one gauze sufficed to disperse the heat, it was much more effectively done with two gauzes, and that under such circumstances the continued burning of the gas inside the gauze was nothing more than a presumed danger, or, in fact, a will-o'-the-wisp. That, as in experimenting with the lamp having the shield on, the engineers of the French Commission, the engineers of the Belgian Commission, and himself (Mr. Marsaut) were unable to make the flame pass out, it was desirable to retain the present arrangement, and that as yet the necessity of any alteration had not been demonstrated to him. Such being Mr. Marsaut's view, he (Mr. Dickinson) had again, through the kindness of Mr. Green, had further tests made, in order to ascertain for what length of time gas burning inside the gauze of the Marsaut was only a presumed danger, and if possible to explode the lamp, and the following were the results of 15 tests, without in any one instance passing the flame outside. Nos. 1, 2, and 3, with the ordinary lateral explosive current in the testing-box, continued respectively 11, 26, and 21 seconds. Others with boards placed in the testing-box, so as to cause upward and downward currents, Nos. 4 and 5 continued respectively seven and six minutes, the gas burning in the lamp until shut off from the apparatus. Nos. 6, 7, 8, 10, and 11 continued respectively three, four, 10, 11, and seven minutes. No. 9 continued 40 seconds. No. 12, with oil on the inner gauze and copper rings, which evaporated by the heat and condensed near the inlet apertures, continued one hour and 22 minutes, when apparently by a momentary irregularity in the current the burning gas in the lamp went out. On this occasion when the lamp was removed from the testing apparatus the shield was found to be about 330° Fahr. Nos. 13 and 14 were continued respectively 22 and 40 seconds. No. 15 was continued 15 minutes. The lamp, he might add, did not appear to be at all injured by the tests. It might be a fair inference that as the shield attained a temperature of about 350° Fahr. in one hour and 22 minutes the heat would in time if an experiment were continued long enough become sufficient to pass the flame. The tests showed, however, that great reliance might be placed upon the lamp, and as it gave more than double the light of a Davy, and did not go out easily when tilted, it seemed likely to suit the requirements of many collieries. For those who objected to a lamp in which gas continued to burn under the gauze in an explosive current there was the lamp in a modified form with the smaller apertures. For those accustomed to test for gas with the lamp in full flame there was still the Davy, which with the tin can might under ordinary circumstances be safely used by firemen for testing. But with the Mueseler and the Marsaut to choose between there seemed to be no longer any excuse for continuing to work with the Davy lamp where it might become exposed to an explosive current.

The CHAIRMAN said the question of safety-lamps was one which had recently drawn a great deal of attention, and he was sure the paper read by Mr. Dickinson would be one of great interest to mining engineers generally. He had great pleasure in proposing a vote of thanks for the paper. The motion having been seconded by Mr. J. AITKEN, was agreed to unanimously, and a discussion followed.

Mr. TEALE said the Society must be very much indebted to Mr. Dickinson for the great trouble he had taken with regard to the Marsaut and other lamps, and it was a matter of deep interest to everyone connected with mines. He should have had some diffidence in entering upon any criticism of the Marsaut lamp had not Mr. Dickinson already discovered that the gas continued to burn in the lamp after the lamp itself had gone out. That being the case it seemed to be simply a question of time whether the Marsaut could be really regarded as an actually safe lamp in the condition it had been sent from abroad. With regard to the modified lamp, there was no doubt the alterations made went a long way towards correcting this defect, and it was due to Mr. Dickinson that this new arrangement had been effected. These modifications, however, raised another difficulty, and with safety-lamps it was an important point to have a sufficiency of pure air, so that they might have a good illuminating power, but if they reduced the apertures and inlets for air this must seriously interfere with the light-giving properties of the lamp because the products of combustion had not the means of getting away so readily as they otherwise should. Then the covering up of the casing in the Marsaut lamp was another disadvantage. If it was to have a loose top this might lead to a system of the top being taken off, which would be a source of danger; whilst, on the other hand, if the shield were fastened it would destroy the power of an efficient inspection of the lamps before they went into the pit. The advantage gained in the Marsaut lamp, that it did not so readily go out when tilted, might also be a source of danger under certain conditions. It was a very common practice to hang the lamps up in a mine, and if the light continued to burn when they were not hung perfectly straight the continued impinging of the flame upon the glass would cause a serious risk of the glass being broken. With regard to the advantage claimed for the wire meshes being made fine, he could only say from experience that he had found the strong meshes to give the best results. Then, as to the statement that the Mueseler had been exploded in an atmosphere of gas, he wished to say that he most emphatically challenged such a statement. He had made hundreds of tests in every possible way with the Belgian Mueseler, but he had never found the gas to explode outside the lamp, and he should like to know how Mr. Marsaut effected this explosion with a Mueseler. There were about 150,000 of the Mueseler lamps in use in this country, and if they would explode outside in an atmosphere of gas they ought be condemned equally with the Davy. In conclusion, Mr. Teale expressed the opinion that Mr. Marsaut ought to furnish them with some particulars as to the method he had pursued with the tests he had made with his lamp, because there were tests and tests, and the tests of the Marsaut lamp might have been so made to gain certain results, that they would hardly bear investigation.

Mr. MACALPINE said he had made a series of tests with regard to the light-giving properties of the Marsaut and the Mueseler lamps, and he had found that there was practically little or no difference between them. He had tested them with both oil and spirits, and the results he might say were precisely similar in both lamps. The experiments that had been made with the Marsaut lamp had perpectly satisfied him, and with the modified form introduced by Mr. Dickinson they had a lamp that would give an equal light in the mine with the Mueseler. With regard to the handiness of the lamp he could only say that the Marsaut they had introduced had given great satisfaction. They were working in a very low mine, in which it would be almost impossible to use the Mueseler, but they had found little or no difficulty with the Marsaut. The men very soon got used to the lamp, and they now liked it. The drawers, however, had had considerable difficuly, but he thought that with the use of oil in the place of spirits in the drawers' lamps this difficulty would be overcome. As to the safety of the lamps, the experiments which had been made by Mr. Dickinson seemed to be conclusive. He did not see that the conditions under which the gas burned in the Marsaut lamp should at all seriously affect its safety. The Marsaut had taken the place of the Davy in their mines, and it had taken the place of the Davy well.

Mr. DICKINSON replied briefly upon the discussion. In giving Mr. Marsaut's views he had condensed them considerably, but he had given what he considered to be the real points. He might add, however, that Mr. Marsaut appeared to have gone very fully and minutely into the whole question in a very thorough and practical manner.

Dr. C. LE NEVE FOSTER, F.G.S., next read a paper "On the Pieler Safety-Lamp for Indicating Small Quantities of Fire-Damp." The object of the paper, he said, was to call attention to some simple methods of testing the air in mines which had been introduced by Mr. Pieler, a German mining engineer, formerly in the Prussian Government service, and now manager of some collieries at Dortmund. Mr. Pieler considered that the percentages of fire-damp and carbonic acid in the atmosphere of collieries should be determined daily, and carefully recorded and tabulated. The plan he adopted at the Joulay Colliery, near Aix-la-Chapelle, consisted in ascertaining the quantity of fire-damp by experiments carried on both above-ground and underground. At some convenient place on the surface he set up a cylindrical aspirator holding 15 gallons, and, placing it in communication with the up-cast shaft by a pipe, he caused it to become gradually filled with the air of the mine, by allowing the water it contained to run out slowly. The sample of air obtained in this way was tested for fire-damp by observing the effect it produced upon a burning jet of hydrogen when allowed to issue all round the flame. Messrs. Mallard and Le Châtelier, of the French Fire-Damp Committee, had pointed out the value of the hydrogen flame as a fire-damp indicator, but, for making the experiments underground, there were difficulties in getting a convenient portable hydrogen lamp. Mr. Pieler found that ¼ per cent. of fire-damp gave a "cap" 4-5th in. high, which increased considerably in height, and also in intensity of colour, as the proportion of fire-damp rose. With practice any proportion between ¼ and 3 per cent. could be estimated within ¼ per cent., knowing the size of the upcast shaft and the velocity of the current, and having made a determination of the percentage of fire-damp by means of the hydrogen flame it was easy to calculate the total quantity of fire-damp issuing from the mine every day. For use underground Mr. Pieler had invented a spirit lamp, which was more convenient than a hydrogen lamp, and, according to his experiments, it afforded sharper indications of small quantities of fire-damp. This lamp was constructed as follows:—It was a suitably altered Davy lamp, and in order to produce a clear and regular flame it was necessary to prevent any vapour of the spirit from acting upon it. The wick was, therefore, carried closely in a long neck, and all the joints were made to fit tightly. The flame was regulated by means of a screw, which passed through a simple stuffing-box at the bottom of the spirit holder. It was advisable to make the latter rather larger than with an oil lamp, so as to be able to carry a sufficient amount of spirit for a journey through the workings. The wire gauze must be made somewhat higher than usual, in order to admit of the full development of the "cap." A small converging chimney was fixed above the burner, and hid the flame for a height of 1½ in., and furnished a fixed starting point for estimating the height of the cap. The best spirit to use was absolute alcohol. The method of testing the air with the spirit lamp was precisely the same as with the ordinary Davy lamp, but it was advisable beforehand to regulate the flame in pure air, so that the point of it was on a level with the top of the chimney. According to the experiments made hitherto the cap which showed itself in air mixed with small quantities of fire-damp behaved as follows:—With ¼ per cent. of fire-damp it was slightly luminous, of a bluish-grey colour, fading away on the outside, and about 1½ in. high; with ½ per cent. it was 2 to 2½ in. high, more sharply defined at its lower end, but still fading away above; with ¾ per cent. the blue colour appeared more plainly, the edges were sharper, and the length of the conical cap was about 3 in.; with 1 per cent. the cone was 3½ in. high, sharply defined, and of an intense blue colour; with a larger percentage the cone increased still further in height; with 1¼ per cent. it was 4 in. high; with 1½ per cent. 4¾ in.; and with 1¾ in. it reached the top of the lamp, the luminosity increased in proportion, and the colour became deep blue; with 2 per cent. the top of the cap widened out decidedly, and with higher percentages it continued to expand until the inside of the gauze was filled with it. In mixtures which contained as much fire-damp as this the Davy lamp exhibited, a cap of its wick was drawn down until the luminous part all but disappeared. For determining the proportion of carbonic acid gas Mr. Pieler employed a specially constructed Winkler apparatus terminating in a long graduated narrow stem, which enabled single thousandths of the contents to be read off with ease. The carbonic acid was absorbed by a solution of potash, and the reduction in volume showed the amount of gas originally present. The practical question presented for consideration was, whether it was necessary or important to have better means for determining the presence of fire-damp than by the ordinary safety-lamp. He (Dr. Foster) thought there was no doubt it was a question which should be answered in the affirmative. According to competent observers it was practically impossible to detect the presence of fire-damp with an ordinary oil safety-lamp when the proportion fell below 2 per cent., and experiments had shown that if a colliery were dusty the air might be rendered explosive with less than 2 per cent. of fire-damp; in other words, the atmosphere might be dangerous to the miner without his being able to ascertain the fact. Under these circumstances it was surely of great importance to obtain an instrument which would discover the presence of the dangerous invisible enemy, even when existing in very small proportions. As far as he was able to judge, the Pieler lamp seemed likely to render useful service in this direction. It was simple and portable, and as its indications resembled, save in degree, those of an ordinary safety-lamp, any intelligent man would soon learn how to use it effectually. There was the disadvantage, however, that as it gave very little light he must carry an ordinary lamp to illuminate his path. It was also necessary to guard the spirit lamp against violent jerks, as a sharp shake would eject a little of the spirit, which made a large flame inside the gauze, and this might be dangerous in a strong current. In order, however, to obviate this risk the reservoir might be filled with sponge; but it should be remembered that the spirit lamp would always be in the hands of a special person, and would, therefore, be less likely to meet with rough usage than the lamp of an ordinary collier. He might add, in conclusion, that Mr. Pieler had a few weeks back informed him that the spirit-lamp was being regularly used at numerous collieries in Westphalia and elsewhere with good results.

A vote of thanks having been passed to Dr. Foster for his paper, a short discussion followed.

Mr. WOODWARD wished to know what the conditions were under which the tests with the lamp had been made?——Mr. DICKINSON said this was an important question. They had to judge by the intensity of the colour as well as by the length of the "cap." When Dr. Foster had brought his paper under his notice he (Mr. Dickinson) had mentioned that in the Protector lamp spirit was used, and that in ordinary circumstances they might see a much larger "cap" with a Protector than they would with an oil lamp. In fact, if they took a Protector lamp in a room where there was no gas they might sometimes see a "cap." What was wanted was an indicator that would be certain, irrespective of conditions.

Mr. MARTIN, Inspector of Mines, remarked that, as he understood, the lamp was intended to be specially applicable for indicating small quantities of gas.

Mr. TEALE said the lamp was an interesting arrangement for indicating small percentages of gas, and he had no doubt it would be very reliable for the purpose.

Mr. HALL, Inspector of Mines, having suggested that the higher temperature at which spirit burned as compared with oil might possibly be a source of danger in the event of a portion of the spirit being jerked on to the gauze of the lamp, and having been replied to by Mr. TEALE that there was no danger from this cause, as the spirit would not adhere to the gauze, and did not ignite until it became evaporated,

Dr. FOSTER, replying to the question which had been asked, said the lamps had been tried continuously in mines, and were being largely used for finding out small quantities of fire-damp.

The proceedings then closed.

EPPS'S COCOA—GRATEFUL AND COMFORTING.—"By a thorough knowledge of the natural laws which govern the operations of digestion and nutrition, and by a careful application of the fine properties of well-selected cocoa, Mr. Epps has provided our breakfast tables with a delicately flavoured beverage which may save us many heavy doctors' bills. It is by the judicious use of such articles of diet that a constitution may be gradually built up until strong enough to resist every tendency to disease. Hundreds of subtle maladies are floating around us ready to attack wherever there is a weak point. We may escape many a fatal shaft by keeping ourselves well fortified with pure blood and a properly nourished frame."—*Civil Service Gazette.*—Made simply with boiling water or milk. Sold only in packets, labelled "JAMES EPPS and Co., Homœopathic Chemists, London."—Also makers of Epps's Chocolate Essence.

## SECTIONAL ORE CRUSHER FOR TRANSPORT OVER MOUNTAINOUS DISTRICTS.

FIG. 1.

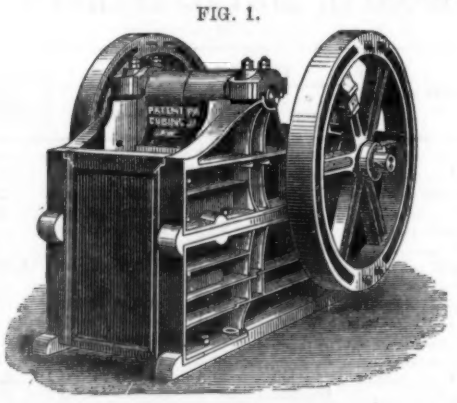


FIG. 2.

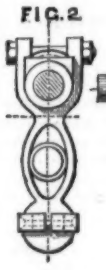
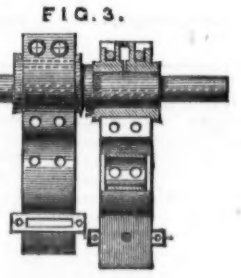


FIG. 3.



### SECTIONAL ORE CRUSHER FOR TRANSPORT OVER MOUNTAINOUS DISTRICTS.

The machines represented in the above engravings, and which are the invention of Mr. C. E. HALL, of Sheffield, are constructed entirely of steel and wrought iron, in sections planed together and fitted after the fashion of Gandow's toy bricks, so that they interlock each other, and, being made right and left hand, cannot possibly be erected in the wrong position. No part exceeds 150 lbs. Besides the above advantageous system of putting together, there is a novel arrangement of jaw-faces, by which the worn part may not only be easily renewed, but the area of working face most liable to rapid wear is confined to one part, which may be worn down until a small proportion of the original weight is thrown away. Another discovery of recent date is the substitution of a special hard steel, resembling chilled iron, whereby great endurance of jaw-face is secured; and, probably, the greatest improvement of all is the substitution of the patent elastic connecting-rod, also of steel, for the solid cast-iron or rigid rod hitherto used, whereby immunity from accident is guaranteed. These machines have been largely used and find great favour, but the special attention to the matter of sectional machinery and the improvements effected of late years call for special attention, now that foreign mining is creating an excitement in its favour.

The patent elastic connecting rods used in Mr. Hall's crusher are composed of best forged spring steel, tempered. They are bent into the form of a loop, and in the centre is placed a circular or elliptical tempered spring, which, whilst transmitting the necessary force to break the stone, yields slightly by the collapsing of the curved sides when undue strain is put upon the machine. These resume their normal shape as soon as the strain is removed; by this means the cast-iron frame and parts are relieved from that fatigue which ultimately destroys the strength of cast-iron. The faces are all planed at the back and deeply chilled on the front side; they are all planed to gauges, and can, therefore, be easily renewed; they are reversible, and the upper and lower faces may be changed together or separately. He claims for his machine that among other advantages a less consumption of power is required to drive them than is necessary for any other maker's machine doing the same amount of work is ensured. A better shape of broken stone is ensured and with less small or waste, there are greater facilities for repairs. An elastic medium destroys the rigidity of the machine, and prevents serious breakages by the fatigue of metal through constant hard work; and lastly, there is greater ease in moving from place to place, and greater stability when at work.

# THE DIVIDEND MINES OF 1883.

WORKED BY PUBLIC COMPANIES.

## COMPILED FROM OFFICIAL SOURCES BY EDWARD ASHMEAD, F.C.A.

(BEING THE EIGHTH ANNUAL TABLE OF SIMILAR INFORMATION.)

## BRITISH METALLIFEROUS DIVIDEND MINES OF 1883.

| Title of Mining Company. | Situation of Mine. | Year commenced. | Ore sold in 1883. Description of ore. | Tons. | Amount. | Dues. | Called up capital. Shares. | Paid. | Amount. | Total amount divided in dividends. | Dividends declared in 1883. Per share. | Amount. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | £ s. d. | | | £ s. d. | £ s. d. | £ | £ s. d. | £ s. d. |
| Dolcoath, Cost-book | Camborne, Cornwall | 1799 | Tin | 1875 | 101,707 0 6 | 1-15th | 4,700 | 9 12 6 | 45,252 2 10 | 587,945 | 3 0 0 | 13,090 0 0 |
| East Pool, Cost-book | Illogan, Cornwall | 1833 | Tin* | 1337 | 66,666 0 0 | 1-20th | 6,400 | 0 9 9 | 3,120 0 0 | 340,188 | 5 3 6 | 33,120 0 0 |
| | | | Sdry. ores | — | 6,273 0 0 | 1-15th | | | | | | |
| Great Holway, Limited | Holywell, Wales | 1877 | Lead | 936 | 9,440 0 0 | 1-15th | 12,000 | 5 0 0 | 60,000 0 0 | 6,530 | 0 7 6 | 4,074 0 0 |
| | | | Blende | 715 | 2,660 0 0 | | | | | | | |
| Great Laxey, Limited | Isle of Man | 1863 | Sil.-Lead† | 1600 | 28,472 0 0 | 1-8th | 15,000 | 4 0 0 | 60,000 0 0 | 448,500 | 1 2 0 | 16,500 0 0 |
| Green Hurth, Limited | Durham | 1864 | Blende | 7150 | 27,875 0 0 | 1-20th | | | | | | |
| | | | Lead | 1049 | 10,167 5 0 | 1-10th | 6,400 | 0 6 0 | 1,920 0 0 | 31,040 | 0 15 0 | 4,800 0 0 |
| Killifreth, Cost-book | Kenwyn, Cornwall | 1873 | Tin | 232 | 12,199 0 1 | 1-20th | 6,000 | 4 16 6 | 25,000 0 0 | 4,350 | 0 4 6 | 1,350 0 0 |
| | | | Copper | 8 | 49 8 10 | | | | | | | |
| | | | Whits | — | 951 10 4 | | | | | | | |
| | | | Arsenic | 28 | 93 2 4 | | | | | | | |
| Lead Hills, Silver Lead, Limited | Lanarkshire | 1876 | Pig Lead | 1743 | 21,724 17 4 | 1-9th | 20,000 | 6 0 0 | 120,000 0 0 | 25,500 | 0 7 6 | 7,500 0 0 |
| | | | Lead Ore | 300 | 2,489 7 6 | | | | | | | |
| Levant, Cost-book | St. Just, Cornwall | 1882 | Tin* | 245 | 13,000 0 0 | 1-24th | 2,500 | 11 4 0 | 28,000 0 0 | 1,250 | 0 10 0 | 1,250 0 0 |
| | | | Copper | 1413 | 7,426 5 6 | 1-20th | | | | | | |
| Lisburne, Limited | near Aberystwith | 1834 | Lead | 730 | 6,727 17 6 | 1-14th | 400 | 18 15 0 | 7,500 0 0 | 246,000 | 1 0 0 | 400 0 0 |
| Mellanear Copper, Limited | Hayle, Cornwall | 1876 | Copper | 6789 | 19,401 3 10 | 1-24th | 10,000 | 2 0 0 | 20,000 0 0 | 21,875 | 0 5 3 | 2,625 0 0 |
| | | | Sundries | 124 | 234 12 8 | | | | | | | |
| Minera, Limited | near Wrexham | 1850 | Lead | 1598 | 14,533 12 6 | 1-12th | 9,000 | 5 0 0 | 45,000 0 0 | 617,716 | 0 3 0 | 1,350 0 0 |
| | | | Blende | 6485 | 26,251 0 3 | | | | | | | |
| Phœnix and West Phœnix, Cost-book | Linkinhorne, Cornwall | 1861 | Tin | 549 | 28,803 1 1 | 1-36th | 12,000 | 6 0 3 | 72,150 0 0 | 184,500 | 0 1 6 | 900 0 0 |
| | | | Copper | 85 | 555 8 6 | | | | | | | |
| Roman Gravels, Limited | Shropshire | 1870 | Lead | 3109 | 25,388 14 0 | 1-12th | 12,000 | 7 10 0 | 90,000 0 0 | 114,900 | 0 5 0 | 3,000 0 0 |
| | | | Blende | 50 | 120 0 0 | | | | | | | |
| South Caradon, Cost-book | St. Cleer, Cornwall | 1835 | — | — | — | 1-18th | 512 | 1 5 0 | 640 0 0 | 384,512 | 2 0 0 | ‡1,024 0 0 |
| South Condurrow, Cost-book | Camborne, Cornwall | 1850 | Tin | 520 | 28,851 0 8 | 1-24th | 6,123 | 7 5 7 | 44,570 6 9 | 63,526 | 1 4 0 | 7,347 12 0 |
| West Kitty, Cost-book | St. Agnes, Cornwall | 1879 | Tin | 317 | 17,898 12 11 | 1-18th | 6,000 | 0 12 0 | 3,600 0 0 | 11,700 | 1 11 0 | 9,300 0 0 |
| Wheal Crebor, Cost-book | Tavistock, Devon | 1858 | Copper | 2526 | 9,698 5 4 | 1-15th | 12,000 | 2 4 0 | 26,400 0 0 | 12,750 | 0 5 0 | 3,000 0 0 |
| | | | Mundic | 782 | 866 13 6 | | | | | | | |
| Wheal Eliza, Cost-book | St. Austell, Cornwall | 1861 | Tin | 506 | 28,813 13 9 | 1-21st | 1,024 | 18 0 0 | 18,432 0 0 | 60,416 | 4 10 0 | 4,608 0 0 |
| Wheal Grenville, Cost-book | Camborne, Cornwall | 1855 | Tin | 390 | 22,180 0 0 | 1-30th | 6,000 | 15 12 6 | 93,750 0 0 | 14,400 | 0 2 6 | 750 0 0 |
| | | | | £ | 541,517 13 11 | | | £ | 765,334 9 7 | £3,177,598 | | £15,988 12 0 |

* East Pool and Levant Mines gave compiler no reply to application for returns, they are estimated from meeting reports, &c.

† Great Laxey returns are from August, 1882, to August, 1883.

‡ South Caradon, this dividend was paid by the old company, the last one under the old workings.

Summary of ores sold as above:—

| | Tons. | Average. | Amount. |
|---|---|---|---|
| Black tin | 5,971 | £53 12 3 | £320,118 9 0 |
| Copper ore | 10,821 | 3 8 7 | 37,130 12 0 |
| Lead ore | 7,722 | 8 18 0 | 68,746 16 6 |
| Silver-lead | 1,600 | 17 15 10 | 28,472 0 0 |
| Pig lead | 1,743 | 12 9 3 | 21,724 17 4 |
| Blende ore | 14,400 | 3 19 0 | 56,906 0 3 |
| Sundries | — | — | 8,418 18 10 |
| Total | | | £541,517 13 11 |

| | | | |
|---|---|---|---|
| In 1879, British Mines | 16 | in number, paid | £99,002 |
| „ 1880 | 32 | „ | 210,651 |
| „ 1881 | 25 | „ | 139,508 |
| „ 1882 | 26 | „ | 161,802 |
| „ 1883 | 19 | „ | 115,988 |

Share quotations in 1883.

| Name. | Price Jan. 1. | Lowest in 1883. | Highest in 1883. | Price Dec. 31. |
|---|---|---|---|---|
| Dolcoath | 66 67 | 55 57 | 67 69 | 61 63 |
| East Pool | 49 51 | 35 37 | 51 53 | 36 37 |
| Great Holway | 5 5¼ | 2 2⅛ | 5⅛ 5⅜ | 2 2⅛ |
| Great Laxey | 17½ 18 | 10½ 11⅛ | 18 19 | 12½ 13⅛ |
| Killifreth | 3 3⅛ | 1 1⅛ | 3 3⅛ | 1 1⅛ |
| Leadhills | 3 3⅛ | 2⅛ 2⅜ | 3 3⅛ | 3 3⅛ |
| Mellanear | 4 4⅛ | 1⅛ 2⅛ | 4 4⅛ | 1⅛ 2⅛ |
| Minera | 7 8 | 3 5 | 7 8 | 5⅛ 6⅛ |
| Phœnix | 2⅛ 2⅛ | 1 1⅛ | 2⅛ 2⅜ | 1 1⅛ |
| Roman Gravels | 9 9⅛ | 5⅛ 6 | 9 9⅛ | 5⅜ 6⅛ |
| South Condurrow | 9½ 10 | 7⅜ 8⅛ | 9⅜ 10⅛ | 9½ 10 |
| West Kitty | 12½ 13 | 9⅜ 10 | 14⅛ 15⅛ | 12 12⅛ |
| Wheal Crebor | 2⅛ 2⅜ | 1⅜ 2 | 3 3⅛ | 1⅜ 2 |
| Wheal Grenville | 7⅛ 8⅛ | 5⅛ 6 | 7⅜ 8⅛ | 5⅛ 6 |

Average prices compared with former years:—

| | Black Tin. | Copper Ore. | Lead Ore. | Blende. |
|---|---|---|---|---|
| 1876 | £44 10 0 | £5 0 6 | £16 2 6 | £3 13 6 |
| 1877 | 41 15 0 | 4 7 0 | 13 1 3 | 3 15 0 |
| 1878 | 35 12 6 | 4 7 0 | 10 13 0 | 3 9 9 |
| 1879 | 42 0 6 | 3 10 6 | 9 18 9 | 3 9 0 |
| 1880 | 52 2 1 | 3 11 0 | 11 6 9 | 4 6 4 |
| 1881 | 54 16 10 | 3 15 6 | 10 2 11 | 3 15 3 |
| 1882 | 59 4 5 | 3 18 6 | 10 5 8 | 3 17 9 |
| 1883 | 53 12 3 | 3 8 7 | 8 18 0 | 3 19 0 |

| | | | |
|---|---|---|---|
| In 1879, Foreign Mines, | 17 | in number, paid | £493,568 |
| „ 1880 | 26 | „ | 861,531 |
| „ 1881 | 24 | „ | 929,558 |
| „ 1882 | 26 | „ | 1,334,822 |
| „ 1883 | 23 | „ | 1,328,581 |

## THE FOREIGN AND COLONIAL METALLIFEROUS DIVIDEND MINES OF 1883.

| Title of Mining Company. | Situation of Property. | Year formed. | For what worked. | Existing allotted capital. Shares | Paid. | Total. | Total amount divided in dividends. | Dividends declared in 1883. Per share. | Total. | Share quotations in 1883. Price, Jan. 1. | Lowest in 1883. | Highest in 1883. | Price, Dec. 31. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | £ | £ s. d. | £ | £ s. d. | £ s. d. | | | | |
| Alamillos, Limited | near Linares, Spain | 1863 | Lead | 35,000 | 2 | 70,000 0 0 | 93,041 | 0 5 0 | 8,750 0 0 | 1⅛ 1⅜ | 1⅛ 1⅜ | 1⅜ 2 | 1⅛ 1⅛ |
| Australian Mining, Limited | Australia | 1844 | Sundries | 18,315 | 7⅜ | 132,399 17 6 | 28,845 | 0 2 0 | 1,831 10 0 | 2⅛ 2⅛ | 2 2⅛ | 3 3⅛ | 2⅛ 3 |
| Birdseye Creek, Limited | California | 1871 | Gold | 15,000 | 4 | 60,000 0 0 | 18,750 | 0 1 0 | 750 0 0 | 1⅛ 1⅛ | 1⅛ 1⅜ | 1⅛ 1⅛ | 1⅛ 1⅛ |
| Bratsberg Copper, Limited | Norway | 1881 | Copper | 30,000 | 2 | 60,000 0 0 | 4,272 | 0 3 1 | 4,272 13 10 | 1⅛ 2⅛ | 1⅛ 1⅜ | 2⅜ 2⅜ | 1⅛ 2⅛ |
| Californian Gold, Limited | Colorado | 1881 | Gold | 121,723 | 1 | 121,723 0 0 | 9,679 | 0 2 0 | 9,679 6 0 | 1 1⅛ | 7-16 9-16 | 1⅛ 1⅛ | 9-16 11-16 |
| Cape Copper, Limited | Cape of Good Hope | 1863 | Copper | 20,000 | 8 | 160,000 0 0 | 1,078,125 | 5 0 0 | *100,000 0 0 | 53 55 | 45 47 | 51 56 | 45 47 |
| Colorado, Limited | Colorado | 1870 | Gold | 61,625 | 5 | 308,125 0 0 | 17,256 | 0 1 0 | 3,081 5 0 | 1⅛ 1⅜ | 1⅛ 1⅜ | 3⅞ 4⅛ | 2 2⅛ |
| Copiapo, Limited | Chili | 1830 | Copper | 50,000 | 3½ | 175,000 0 0 | 137,893 | 0 7 6 | 18,665 12 6 | 3⅜ 4⅛ | 3 3⅛ | 3½ 4 | 3⅛ 3⅜ |
| Fortuna, Limited | near Linares, Spain | 1854 | Lead | 25,000 | 2 | 50,000 0 0 | 211,562 | 0 6 3 | 7,812 10 0 | 3⅛ 3⅜ | 2⅜ 3⅛ | 3⅛ 3⅜ | 3⅛ 3⅜ |
| Frontino and Bolivia, Limited | U.S. Columbia | 1864 | Gold | 70,835 | 2 | 141,670 0 0 | 39,022 | 0 2 0 | 7,045 13 0 | 2⅛ 2⅛ | 1⅛ 1⅛ | 2⅜ 2⅛ | 1⅛ 1⅛ |
| Henriett Mining and Smelting, Li. | Colorado | 1882 | Lead | 270,000 | 1 | 270,000 0 0 | 10,800 | 2 per cent. | 5,400 0 0 | 1⅛ 1⅛ | 1⅛ 1⅛ | — | — |
| Linares Lead Company, Limited | near Linares, Spain | 1852 | Lead | 15,000 | 3 | 45,000 0 0 | 277,225 | 0 6 6 | 4,875 0 0 | 3⅛ 3⅜ | 3 3⅛ | 3⅛ 3⅜ | 3⅛ 3⅛ |
| Mason and Barry, Limited | Portugal | 1878 | Copper, &c. | 185,164 | 10 | 1,851,640 0 0 | 956,304 | 1 5 0 | 231,455 0 0 | 15⅛ 16⅛ | 13 13½ | 16⅛ 17 | 13 13½ |
| Panulcillo Copper, Limited | Chili | 1864 | Copper | 50,000 | 4 | 200,000 0 0 | 96,875 | 0 12 0 | 30,000 0 0 | 6 6½ | 5⅛ 6 | 6⅛ 7⅛ | 5⅛ 6 |
| Richmond Consolidated, Limited | Eureka, Nevada | 1871 | Gold, sil., & lead | 54,000 | 5 | 270,000 0 0 | 795,017 | 0 15 0 | 40,500 0 0 | 6⅛ 6⅜ | 4⅜ 5 | 7⅛ 7⅜ | 4⅜ 5 |
| Rio Tinto, Limited | Andalucia, Spain | 1873 | Copper, &c. | 325,000 | 10 | 3,250,000 0 0 | 1,337,500 | 1 8 0 | 455,000 0 0 | 22½ 23⅛ | 18½ 19⅛ | 24 25 | 19 20 |
| Scottish Australian, Limited | New South Wales | 1859 | Various | 120,000 | 1 | 160,000 0 0 | 276,382 | 15 per cent | 24,000 0 0 | 2 2⅛ | 2 2⅛ | 2⅛ 2⅛ | 2 2⅛ |
| | | | | 80,000 | ¼ | | | | | | | | |
| Sierra Buttes, Limited | Sierra, California | 1870 | Gold | 122,500 | 2 | 245,000 0 0 | 268,995 | 0 2 0 | 12,250 0 0 | 1⅜ 1⅝ | 1 1⅛ | 1⅛ 1⅛ | 1⅛ 1⅜ |
| Ditto Plumas Eureka | Plumas, California | 1872 | Gold | 140,625 | 2 | 281,250 0 0 | 323,435 | 0 4 0 | 28,125 0 0 | 1⅛ 1⅜ | 1⅛ 1⅛ | 1⅛ 1⅜ | 1⅛ 1⅛ |
| Tharsis Sulphur and Copper, Lim. | Andalucia, Spain | 1866 | Copper, &c. | 587,330 | 2 | 1,174,660 0 0 | 3,001,323 | 27½ per ct. | 314,479 0 0 | 7⅛ 7⅜ | 6 6½ | 7⅛ 7⅜ | 6 6½ |
| Tolima Mining, Limited | U.S. Columbia | 1871 | Gold and Silver | 13,154 | 5 | 95,770 0 0 | 41,260 | 1 0 0 | †13,154 0 0 | 7 9 | 5 6 | 7 9 | 5½ 6½ |
| | | | | 6,000 | 5 | | | | | | | | |
| Western Andes, Limited | U.S. Columbia | 1872 | Gold | 14,910 | 5 | 74,550 0 0 | 61,557 | 0 10 0 | 7,455 0 0 | 4½ 5½ | 4½ 5½ | 5⅛ 5⅜ | 5⅛ 5⅜ |
| | | | | | £ | 9,196,787 17 6 | £9,085,118 | | £1,328,581 10 4 | | | | |

* Cape Copper, including Bonus of 1*l.* per Share.

† Tolima, Dividend on the Preference Shares only.

The information in these tables is obtained in nearly every instance direct from the respective offices, and every effort has been made to make it reliable.

## PRACTICAL MINING—VALUATION OF COPPER ORE, AND PAYMENT OF TRIBUTERS.—No. II.

TO FIND THE QUANTITY OF FINE COPPER IN A PARCEL OF ORE OF ANY GIVEN PRODUCE.—*Rule:* Divide the dry weight of the ore, taking decimally the fractional parts of a ton of 21 cwts. (Table B) by 100, and then multiply by the produce. Point off as many figures, commencing from the right hand, in the product as there are decimal places in the multiplier and in the multiplicand combined. The figures on the left of the point will show the number of tons of fine copper in the parcel, the fractional parts of 1 ton (which is now regarded as a ton of 20 cwts.) being represented by the figures on the right of the point; the value of these fractional parts in hundredweights, quarters, and pounds must be found by Table C.

*Example.*—We will calculate how much fine copper the smelter pays for in William Mitchell's ore, to which we have already referred. Thus:

| 1.—By Decimals. | 2.—By Mixed Fractions. |
|---|---|
| ·214048 | ·214048 |
| 7·25 | 7¼ |
| 1070240 | 1·498336 |
| 428096 | 53512 |
| 1498336 | |
| | 1·5518,48 |

1·5518,4800 = 1 ton 11 cwts. 0 qrs. 4 lbs.

Here we first wrote down 21· for the tons, and placed against it ·4048, which is shown by Table B to be equivalent to 8 cwts. 2 qrs., which gives us 21·4048. We have to divide this by 100 which is instantly done by removing the point two places towards the left, which gives ·214048. Each movement of a decimal point to the *left* divides by 10, and 10 times 10 = 100, therefore moving the point two places to the left divides by 100. If we move a decimal point one place to the *right* we multiply by 10. In multiplying by the produce we can use either the vulgar fraction (7¼) or the decimal fraction (7·25), and in the product we take no notice of any decimal beyond the fourth; if the fifth decimal be *less* than 5; if the fifth decimal be *more* than 5 we add one to the fourth decimal: Thus, for ·668570 we write ·6686. The fine copper in the ore of the other four tributers can be calculated for practice. The odd pounds of fine copper which are never calculated in practice are found thus:

From 1·5518
Deduct 1·5500 = 1 ton 11 cwts. 0 qrs. 0 lbs. (see Table C.)

·0018 = 0 ton 0 cwts. 0 qrs. 4 lbs. (see Table C.)

Total ..... 1 ton 11 cwts. 0 qrs. 4 lbs.

Now we have already seen that the average standard does not in any way control the price to be paid by the smelter for any given parcel of ore, and that the smelter in making his bid merely considers the value of the metal in the ore and the cost of getting it out, so that it is obvious in determining the value of the several tributers' ores mixed to make a market parcel; the *real standard* is the sole reliable basis for calculation, and to find this *real standard* we must, of course, know (approximately, at least) how much it costs a smelter to extract a ton of fine copper from ore of any given produce. Referring to this subject Dr. Percy states that "no reliable *general* estimate of the cost of *smelting* copper can be furnished, as it must of necessity vary with the ever-varying cost of fuel, labour, iron, firebrick, and other materials; and this variation applies even to any particular works at different periods, while scarcely any two works are precisely similarly circumstanced. Thus, at one establishment fuel now costs nearly double what it did some years ago at the pit's mouth, and wages are at least 10 per cent. higher. Then the cost of smelting a particular kind of ore varies much with the circumstances of the smelter's stock; at one period calcination may be saved by fortunate concurrence of another description of ore, and not only so, but the admixture be productive of cleaner than ordinary slag. On the other hand, every process may have to be encountered, and the result as to slag may be unsatisfactory. . . . Nothing, in fact, short of an examination of a smelter's accounts would be any guide in a commercial point of view, and not even that unless the quantity of ore of each kind and its percentage were set forth. . . . . Large quantities of copper ore are bought at the mines, and carried at the smelter's expense to a shipping port. From one mine the carriage may be 3s. per ton, from another 10s., then there is freight to the landing place, and at one establishment the ore may be landed nearly at the furnace mouth, at another it may have to be transshipped into barges or loaded into railway wagons at an extra cost of some shillings per ton. . . . For example, it may be stated that in one case the cost of conveying copper to market, the agency in selling it, and the discount allowed to purchasers for prompt payment, equalled the cost of making copper from some richer descriptions of ore."

But, although we cannot calculate upon such general data as are usually at the disposal of the miner, the exact amount that will be paid for extracting the copper from each particular parcel of ore, we can, fortunately by taking the average expense incurred by a smelter (as ascertained from the actual outlay made for smelting, costs, &c., in the course of a lengthened experience) obtain an approximation so close to the exact amount as to be ample for all practical purposes. Dr. Percy tells us that Sir William Logan informed him that, whilst himself engaged in copper smelting, he ascertained with great care the exact cost of each operation, and deduced therefrom a formula for calculating the total cost of the entire process with ores of varying produce. Fortunately this is precisely what we require to enable us to determine the *real standard*, or "Royal School of Mines standard," upon which a smelter has purchased any particular parcel of copper ore. The formula is—

$$\frac{100 \times a + (b \times c)}{b}$$

where $a$ is a fixed expense per ton of ore; $b$ the produce of the ore; and $c$ an additional expense per unit of produce as determined by the Cornish method of assaying. This formula comprises all expenses from the purchase of the ore (exclusive of Cornish carriage) to the refining of the copper inclusive, and Sir William assured Dr. Percy that he found it applicable to all ores *without exception*. Since Sir William Logan ceased to be connected with copper smelting the improvements introduced and altered circumstances permitted of the value of $c$ being somewhat reduced, and Dr. Percy found that the formula, with the modification mentioned, gave very nearly the same sum as charged for smelting costs in an actual balance-sheet of one of the largest firms at Swansea which he had the opportunity of inspecting. In Table A subjoined the cost, as ascertained from the above formula ($c$ = ·08), of extracting 1 ton of fine copper from ores of varying produce is given, so that by merely adding the amoun shown in the table for ore of a given produce to the price paid for "copper in the ore" the *real standard* can be instantly obtained:—

TABLE A.

| Produce. | Smelting Cost. Per Unit. | Smelting Cost. Fine Copper. | Produce. | Smelting Cost. Per Unit. | Smelting Cost. Fine Copper. | Produce. | Smelting Cost. Per Unit. | Smelting Cost. Fine Copper. |
|---|---|---|---|---|---|---|---|---|
| | s. d. | £ s. d. | | s. d. | £ s. d. | | s. d. | £ s. d. |
| 0 ... | — | — | 10 ...2 | 7¼...13 | 0 0 | 20 ...2 | 1¾...10 | 10 0 |
| ⅛...29 | 6 ...145 | 10 0 | ⅛...2 | 7 ...12 | 18 10 | ⅛...2 | 1¾...10 | 9 8 |
| ¼...19 | 1¾... 95 | 10 0 | ¼...2 | 7 ...12 | 17 7¼ | ¼...2 | ...10 | 9 4 |
| ⅜...15 | 9 ... 78 | 16 4¾ | ⅜...2 | 6¾...12 | 16 4¾ | ⅜...2 | 1 ...10 | 9 0 |
| ½...13 | 10¼... 69 | 6 7¼ | ½...2 | 6¾...12 | 15 5 | ½...2 | 1 ...10 | 8 8 |
| ⅝...12 | 6¾... 62 | 13 2½ | ⅝...2 | 6¾...12 | 14 2½ | ⅝...2 | 1 ...10 | 8 4 |
| ¾...11 | 7¾... 58 | 4 5 | ¾...2 | 6¾...12 | 13 2¼ | ¾...2 | 1 ...10 | 8 0 |
| ⅞...11 | 0 ... 55 | 1 0 | ⅞...2 | 6¾...12 | 12 2⅛ | ⅞...2 | 0¾...10 | 7 9 |
| 1 ...10 | 6¼... 52 | 13 2⅛ | 11 ...2 | 6¾...12 | 11 2⅛ | 21 ...2 | 0¾...10 | 7 6 |
| ⅛...10 | 2 ... 50 | 16 2¼ | ⅛...2 | 6 ...12 | 10 0 | ⅛...2 | 0¾...10 | 7 3 |
| ¼... 9 | 7¼... 48 | 0 0 | ¼...2 | 6 ...12 | 9 0 | ¼...2 | 0¾...10 | 7 0 |
| ⅜... 8 | 10⅛... 44 | 7 4¾ | ⅜...2 | 5¾...12 | 8 0 | ⅜...2 | 0¾...10 | 6 9 |
| ½... 8 | 3 ... 41 | 6 7½ | ½...2 | 5¾...12 | 7 0 | ½...2 | 0¾...10 | 6 6 |
| ⅝... 7 | 9 ... 38 | 15 5 | ⅝...2 | 5½...12 | 6 0 | ⅝...2 | 0¾...10 | 6 3 |
| ¾... 7 | 3½... 36 | 11 4½ | ¾...2 | 5½...12 | 5 0 | ¾...2 | 0¾...10 | 6 0 |
| ⅞... 6 | 11¼... 34 | 13 4⅛ | ⅞...2 | 5¼...12 | 4 2 | ⅞...2 | 0¾...10 | 5 9 |
| 2 ... 6 | 7¼... 33 | 0 0 | 12 ...2 | 5¼...12 | 3 6 | 22 ...2 | 0¼...10 | 5 6 |
| ⅛... 6 | 3⅝... 31 | 10 7¼ | ⅛...2 | 5 ...12 | 2 6 | ⅛...2 | 0¼...10 | 5 2 |
| ¼... 6 | 0¼... 30 | 4 5 | ¼...2 | 5 ...12 | 1 7½ | ¼...2 | 0¼...10 | 4 10 |
| ⅜... 5 | 9¼... 29 | 1 0 | ⅜...2 | 4¾...12 | 0 9¾ | ⅜...2 | 0¼...10 | 4 6 |
| ½... 5 | 7½... 28 | 0 0 | ½...2 | 4¾...12 | 0 0 | ½...2 | 0¼...10 | 4 3 |
| ⅝... 5 | 5 ... 27 | 1 0 | ⅝...2 | 4¾...11 | 19 2½ | ⅝...2 | 0¼...10 | 4 0 |
| ¾... 5 | 2¾... 26 | 3 7¾ | ¾...2 | 4¾...11 | 18 4½ | ¾...2 | 0¼...10 | 3 9½ |
| ⅞... 5 | 1 ... 25 | 7 9½ | ⅞...2 | 4¾...11 | 17 7¼ | ⅞...2 | 0¼...10 | 3 7¼ |
| 3 ... 4 | 11¼... 24 | 13 2⅝ | 13 ...2 | 4¼...11 | 17 0 | 23 ...2 | 0¼...10 | 3 5 |
| ⅛... 4 | 9¼... 24 | 0 0 | ⅛...2 | 4¼...11 | 16 2½ | ⅛...2 | 0¼...10 | 3 2¼ |
| ¼... 4 | 8¼... 23 | 7 7¾ | ¼...2 | 4¼...11 | 15 4¾ | ¼...2 | 0¼...10 | 3 0 |
| ⅜... 4 | 6¼... 22 | 16 4¾ | ⅜...2 | 4 ...11 | 14 9½ | ⅜...2 | 0¼...10 | 2 9 |
| ½... 4 | 5¼... 22 | 7 9½ | ½...2 | 4 ...11 | 14 2⅛ | ½...2 | 0¼...10 | 2 6 |
| ⅝... 4 | 4¼... 21 | 15 9½ | ⅝...2 | 4 ...11 | 13 9½ | ⅝...2 | 0¼...10 | 2 3 |
| ¾... 4 | 3 ... 21 | 6 9⅛ | ¾...2 | 3¾...11 | 12 10 | ¾...2 | 0¼...10 | 2 0 |
| ⅞... 4 | 2¼... 20 | 13 0 | ⅞...2 | 3¾...11 | 12 2⅛ | ⅞...2 | 0¼...10 | 1 9½ |
| 4 ... 4 | 1¼... 20 | 10 0 | 14 ...2 | 3½...11 | 11 6 | 24 ...2 | 0¼...10 | 1 7¾ |
| ⅛... 4 | 0¼... 20 | 2 4¾ | ⅛...2 | 3½...11 | 10 10 | ⅛...2 | 0¼...10 | 1 4¾ |
| ¼... 3 | 11½... 19 | 15 2½ | ¼...2 | 3½...11 | 10 3 | ¼...2 | 0 ...10 | 1 2½ |
| ⅜... 3 | 10½... 19 | 8 7½ | ⅜...2 | 3½...11 | 9 7½ | ⅜...2 | 0 ...10 | 1 0 |
| ½... 3 | 9¾... 19 | 2 2¾ | ½...2 | 3½...11 | 9 0 | ½...2 | 0 ...10 | 0 9½ |
| ⅝... 3 | 9 ... 18 | 16 2½ | ⅝...2 | 3¼...11 | 8 4¾ | ⅝...2 | 0 ...10 | 0 7¼ |
| ¾... 3 | 8½... 18 | 10 7½ | ¾...2 | 3¼...11 | 7 9½ | ¾...2 | 0 ...10 | 0 4¾ |
| ⅞... 3 | 8 ... 18 | 5 2½ | ⅞...2 | 3¼...11 | 7 2½ | ⅞...2 | 0 ...10 | 0 2½ |
| 5 ... 3 | 7¼... 18 | 0 0 | 15 ...2 | 3 ...11 | 6 8 | 25 ...2 | 0 ...10 | 0 0 |
| ⅛... 3 | 6¾... 17 | 5 2½ | ⅛...2 | 3 ...11 | 6 0 | ⅛...2 | 0 ... 9 | 19 9½ |
| ¼... 3 | 6 ... 17 | 10 5 | ¼...2 | 3 ...11 | 5 6 | ¼...2 | 0 ... 9 | 19 7½ |
| ⅜... 3 | 5½... 17 | 6 0 | ⅜...2 | 3 ...11 | 5 0 | ⅜...2 | 0 ... 9 | 19 4¾ |
| ½... 3 | 5 ... 17 | 1 10 | ½...2 | 3 ...11 | 4 8 | ½...1 | 11¾... 9 | 19 2⅛ |
| ⅝... 3 | 4½... 16 | 17 6 | ⅝...2 | 2¾...11 | 4 2 | ⅝...1 | 11¾... 9 | 19 0 |
| ¾... 3 | 4 ... 16 | 14 0 | ¾...2 | 2¾...11 | 3 7½ | ¾...1 | 11¾... 9 | 18 9½ |
| ⅞... 3 | 3½... 16 | 10 2½ | ⅞...2 | 2¾...11 | 3 0 | ⅞...1 | 11¾... 9 | 18 7¾ |
| 6 ... 3 | 3 ... 16 | 6 8 | 16 ...2 | 2½...11 | 2 6 | 26 ...1 | 11½... 9 | 18 4½ |
| ⅛... 3 | 2½... 16 | 3 3 | ⅛...2 | 2½...11 | 2 0 | ⅛...1 | 11½... 9 | 18 2⅛ |
| ¼... 3 | 2⅛... 16 | 0 0 | ¼...2 | 2½...11 | 1 6 | ¼...1 | 11½... 9 | 18 0 |
| ⅜... 3 | 2 ... 15 | 16 9½ | ⅜...2 | 2½...11 | 1 0 | ⅜...1 | 11½... 9 | 17 9½ |
| ½... 3 | 1⅝... 15 | 13 9½ | ½...2 | 2½...11 | 0 6 | ½...1 | 11½... 9 | 17 7¼ |
| ⅝... 3 | 1¼... 15 | 11 0 | ⅝...2 | 2½...11 | 0 0 | ⅝...1 | 11¼... 9 | 17 4¾ |
| ¾... 3 | 1 ... 15 | 8 2½ | ¾...2 | 2½...10 | 19 8 | ¾...1 | 11¼... 9 | 17 2⅛ |
| ⅞... 3 | 0¾... 15 | 5 4¾ | ⅞...2 | 2¾...10 | 19 4 | ⅞...1 | 11¼... 9 | 17 0 |
| 7 ... 3 | 0¼... 15 | 2 10 | 17 ...2 | 2¼...10 | 19 0 | 27 ...1 | 11½... 9 | 16 10⅝ |
| ⅛... 3 | 0 ... 15 | 0 8 | ⅛...2 | 2¼...10 | 18 6 | 28 ...1 | 11½... 9 | 15 8 |
| ¼... 2 | 11¾... 14 | 18 0 | ¼...2 | 2¼...10 | 18 0 | 29 ...1 | 11¾... 9 | 14 4 |
| ⅜... 2 | 11½... 14 | 15 7¾ | ⅜...2 | 2 ...10 | 17 6 | 30 ...1 | 11¾... 9 | 13 0 |
| ½... 2 | 11¼... 14 | 13 4¾ | ½...2 | 2 ...10 | 17 0 | 31 ...1 | 11 ... 9 | 12 0 |
| ⅝... 2 | 11 ... 14 | 11 2½ | ⅝...2 | 2 ...10 | 16 7½ | 32 ...1 | 11 ... 9 | 11 1 |
| ¾... 2 | 10¾... 14 | 9 0 | ¾...2 | 2 ...10 | 16 3 | 33 ...1 | 10¾... 9 | 10 3 |
| ⅞... 2 | 10½... 14 | 7 0 | ⅞...2 | 2 ...10 | 15 10 | 34 ...1 | 10¾... 9 | 9 5 |
| 8 ... 2 | 10¼... 14 | 5 0 | 18 ...2 | 2 ...10 | 15 5 | 35 ...1 | 10¼... 9 | 8 7 |
| ⅛... 2 | 10 ... 14 | 3 0 | ⅛...2 | 1¾...10 | 15 0 | 36 ...1 | 10¼... 9 | 7 10 |
| ¼... 2 | 9¾... 14 | 1 2½ | ¼...2 | 1¾...10 | 14 8 | 37 ...1 | 10¼... 9 | 7 1 |
| ⅜... 2 | 9½... 13 | 19 4¾ | ⅜...2 | 1¾...10 | 14 4 | 38 ...1 | 10¼... 9 | 6 4 |
| ½... 2 | 9¼... 13 | 17 7¾ | ½...2 | 1¾...10 | 14 0 | 39 ...1 | 10¼... 9 | 5 8 |
| ⅝... 2 | 9 ... 13 | 16 1 | ⅝...2 | 1¾...10 | 13 8 | 40 ...1 | 10¼... 9 | 5 0 |
| ¾... 2 | 9 ... 13 | 14 2½ | ¾...2 | 1¾...10 | 13 4 | 41 ...1 | 10¼... 9 | 4 5 |
| ⅞... 2 | 8¾... 13 | 12 7¾ | ⅞...2 | 1½...10 | 13 0 | 42 ...1 | 10¼... 9 | 3 10 |
| 9 ... 2 | 8¾... 13 | 11 0 | 19 ...2 | 1½...10 | 12 8 | 43 ...1 | 10 ... 9 | 3 3 |
| ⅛... 2 | 8½... 13 | 9 4¾ | ⅛...2 | 1½...10 | 12 4 | 44 ...1 | 10 ... 9 | 2 9 |
| ¼... 2 | 8¼... 13 | 8 0 | ¼...2 | 1½...10 | 12 0 | 45 ...1 | 10 ... 9 | 2 3 |
| ⅜... 2 | 8 ... 13 | 6 8 | ⅜...2 | 1½...10 | 11 8 | 46 ...1 | 10 ... 9 | 1 9 |
| ½... 2 | 8 ... 13 | 5 3 | ½...2 | 1½...10 | 11 4 | 47 ...1 | 9¾... 9 | 1 3 |
| ⅝... 2 | 7¾... 13 | 3 9¾ | ⅝...2 | 1¼...10 | 11 0 | 48 ...1 | 9¾... 9 | 0 10 |
| ¾... 2 | 7½... 13 | 2 4¾ | ¾...2 | 1½...10 | 10 8 | 49 ...1 | 9¾... 9 | 0 5 |
| ⅞... 2 | 7½... 13 | 1 2½ | ⅞...2 | 1½...10 | 10 4 | 50 ...1 | 9½... 9 | 0 0 |

When it is required to go to so great a nicety as 1-16th in the produce the amounts representing the produces next above and next below the 16th may be added together and the sum divided by 2. Thus, in the case of the mixed parcel we have been dealing with we found that the smelter paid 62*l.* 10s. per ton of "copper in the ore" for 6 11-16 produce; so that the smelting cost will be thus found:—

| | | | |
|---|---|---|---|
| 6¼ | = | £15 | 11 0 |
| 6¾ | = | 15 | 8 2½ |
| 2) | | 30 | 19 2½ |
| | | £15 | 9 7½ |

And adding 15*l.* 9s. 7½d. to the 62*l.* 10s. we find the *real standard* for the parcel to be 77*l.* 19s. 7½d., and if we deduct from this *real standard* of 77*l.* 19s. 7½d. the smelting costs (as shown by Table A) we shall learn the price per ton of copper in the ore which each tributer is entitled to receive, so that the account will stand thus:—

| No. | Prod. of Ore. | Fine Copper. | Copper in Ore: | Value of Ore. |
|---|---|---|---|---|
| 1 ... | 8 ... | ·2949 ... | £63 14 7¼ ... | £18 15 10½ |
| 2 ... | 5½ ... | ·8872 ... | 60 17 9½ ... | 54 0 5 |
| 3 ... | 7¼ ... | 1·5518 ... | 63 1 7¼ ... | 97 17 9 |
| 4 ... | 7½ ... | ·3750 ... | 63 6 2½ ... | 23 14 9¾ |
| 5 ... | 6½ ... | ·6686 ... | 62 5 9¾ ... | 41 12 11½ |
| Total..... | 6 11-16 | 3·7769 | £62 10 0 | £236 1 9¾ |

The advantage of working with the *real standard* instead of the nominal one (usually called the "average standard") is here apparent, for it has enabled us to calculate the value of each of the five parcels directly from the fine copper without going through the additional processes of calculating the price per ton of ore which each standard represents, and then finding the value of the several parcels of ore at the given price per ton. It will be seen that the total obtained by adding together the amounts estimated to be due to each tributer is 236*l.* 1s. 9¾d., whilst the amount actually received was 235*l.* 17s. 9d., so that the difference for the entire market parcel is only 4s. 0¾d., or considerably *less* than *one farthing* in the pound. If we deduct ¼d. in £1 from each of the five parcels we shall have 10¼d. in hand, which we can dispose of by allotting two to each tributer and the odd farthing to the owner of the most valuable parcel. This will give John Penrose 18*l.* 15s. 7¾d.; Thomas Buglehole, 53*l.* 19s. 5¼d.; William Mitchell, 97*l.* 15s. 11d.; John Thomas, 23*l.* 14s. 5¼d.; and Henry Williams, 41*l.* 12s. 3d., and if they always have an equal amount of justice done to them they will not have much cause to complain.

## INFLUENCE OF GEOLOGY ON BRITISH SCENERY.

In continuation of his lectures on the general principles of geographical evolution delivered last year at the Royal Institution, Mr. Archibald Geikie, LL.D., F.R.S., Director-General of the Geological Survey, is now giving a very interesting series on the history of the origin of the present scenery of the British Islands. He explained that the insular position of Britain is merely accidental, and has not always been maintained. The real extent of the European area and the intimate relation of Britain with the Continent are well shown by the Admiralty charts. If the west of Europe were elevated 200 ft.—that is, the height of the London Monument—the Straits of Dover, half of the North Sea, and a large part of the English Channel would be turned into dry land. If the elevation extended 600 ft.—that is, merely the united heights of St. Paul's and the Monument—the whole of the North Sea, the Baltic, and the English Channel would become land. There would likewise be added to the European area a belt of territory from 100 to 150 miles broad, stretching to the west of Ireland and Scotland. A vast plain would unite Britain to Denmark, Holland, and Belgium, and would present two platforms, of which the more southerly would stretch from what is now the Straits of Dover northward to the northern edge of the Dogger Bank.

The steep declivity separating the two plateaus is doubtless a prolongation of the jurassic and cretaceous escarpments of Yorkshire. It is trenched at either end by marked depressions, of which the western is a magnificent valley through which the united waters of the Rhine and Thames would flow between the Dogger Bank and the Yorkshire cliffs. The eastern gap would allow the combined Elbe and Weser to escape into the northern plain. Possibly all those rivers would unite on that plain, but, in any case, they would fall into a noble fjord which would then be revealed following the southern coast line of Norway. Altogether an area more than thrice that of Britain would be added to Europe. By a total rise of 1800 feet, Britain would be united to the Faroe Islands and Iceland; while the Arctic and Atlantic oceans would be separated. From its position on the oceanic border of a Continent, Britain has been exposed to a great variety of geological changes. In such a position marine erosion and deposit are most active, and a slight upheaval or depression which would have no sensible effect in the interior of a Continent makes all the difference between land and water. Moreover, there appears to be a tendency to special disturbance along the edge of an ocean. Britain has grown from north to south. The oldest upheavals ridged up the palæozoic rocks into folds running north-north-east and south-south-west, of which remains may yet be seen in Scotland, in the Lake Country, and in Wales. By a later series of forces the younger palæozoic rocks were thrown into east and west ridges, which still powerfully affect the topography in southern Ireland, and thence through South Wales and Belgium. The same general direction was followed by the more important subsequent European disturbances. Some of the latest movements that have powerfully affected the development of our scenery were those that gave the secondary rocks their general tilt to the south-east. It is very doubtful if any part of the existing topography can be satisfactorily traced back beyond middle or older tertiary time. The amount of erosion of some of the hardest rocks of the country since that date has been prodigious. All the mountains of Britain are the effect of erosion on areas of land successively upheaved above the sea.

In the development of their forms the general outlines have been mainly determined by erosion independent of geological structure; while the details have been chiefly guided by structure, but partially also by the rate and kind of erosion. Ruggedness has resulted primarily from structure, but has been aggravated by greater activity of erosion. The mountainous west, with a greater rainfall and steeper slopes, is more rugged than the mountainous east. The tablelands of Britain are of two orders—(1) those of deposit, which may be either (*a*) of sedimentary rocks, horizontal, or nearly so, as in the millstone grit and Jurassic plateaux of Yorkshire, or (*b*) of volcanic rocks—as in the wide plateaux of Antrim, Mull, and Skye; (2) those of erosion, where, as the result of long-continued degradation, a series of plicated rocks has been cut down into a more or less uniformly level surface, as in South Wales. By the elevation of such a surface into a high plateau, erosion begins anew, and the plateau is eventually trenched into a system of ridges and isolated hills, as has happened in the Highlands.

British plains have been produced by the spreading out of detritus by the operation of rain and rivers, as in river terraces and alluvial plains; by the sea, as in raised beaches; or by land ice and floating ice, as in the glacial drifts of the lowlands. The existing watershed of Britain is profoundly significant, affording a kind of epitome of the geological revolutions through which the surface of the country has passed. It lies nearer the west than the east coast. The western slope being thus the steeper, as well as the more rainy, erosion must be greater on that side, and consequently the watershed must be slowly moving eastward. Probably the oldest part of the watershed is to be found in the Highlands, where its trend from north-north-east to south-south-west was determined by the older palæozoic upheaval.

AN AUSTRALIAN LIGHTHOUSE.—The Macquarie Lighthouse, at the entrance to Port Jackson, is one of the largest and finest in the world; it is also the grandest example of electric lighting of which the southern hemisphere can boast. It was commenced on March 1, 1880, and the light in connection with it was brought into operation on June 1, 1883. The old lighthouse, which the new one has replaced, was built in 1816, and was the first structure of the kind in the southern hemisphere. It is equally interesting, and also illustrative of the enterprise of the Colony, that the electric light is the first used for lighthouse purposes. The light is of the first order, 16 sided, dioptric, holophotal revolving white light, of the system of Fresnel, showing a flash of eight seconds in every minute, and having a range of 25 miles seaward. It is, however, discernible for a considerably greater distance, owing to the luminosity produced in the atmosphere by the electric beam before the direct rays become visible. It was constructed by Chance Brothers, and Co., of Birmingham, under the supervision of Mr. James N. Douglas, engineer to the Trinity Board, who states "the Macquarie light is at the present moment the most efficient in the world." Also that he had "invented an improvement in oil and gas burners, by which a greater condensation of the focal light is effected than hitherto," which he had "placed at the disposal of Messrs. Chance Brothers for the Macquarie light, free of royalty, and consequently the gas and oil burners for use during clear weather have, with flames of 1½ in. diameter, an intensity of about 200 candles instead of 80 candles with the same diameter, as with the old type of burner originally intended. When these flames are at the focus, there is a consumption with the 16 candle gas of about 40 cubic ft. per hour, and with good paraffin of about one pint per hour, and I estimate the mean intensity of the flashes from the apparatus at about 40,000 candles, or about five times the intensity of the flashes of the present Macquarie light. With full power of the electric light at the focus, the mean intensity of the flashes in the direction of the sea horizon is not less than five or six millions of candles. By a simple arrangement the change from gas-light to electric light at the focus, or the reverse, can be effected in 10 seconds, and the flames of the oil lamp can be substituted for the gas or electric light in nearly the same space of time." The Macquarie lighthouse is intended only to illumine half the horizon; it is, therefore, possible to make use of the landward rays by means of a dioptric mirror. This is probably the first instance of the use of a dioptric mirror for an electric light. Special adjustment was needed to attain the result in a satisfactory manner. The whole apparatus is carried on a round pedestal, which offers the great advantage of enabling the keeper to enter without interfering with the rotation of the apparatus. Arrangement are made to burn either gas or paraffin oil, or to exhibit the electric light at full power or half power. When the electric light is in use there is always a second lamp in readiness for action.

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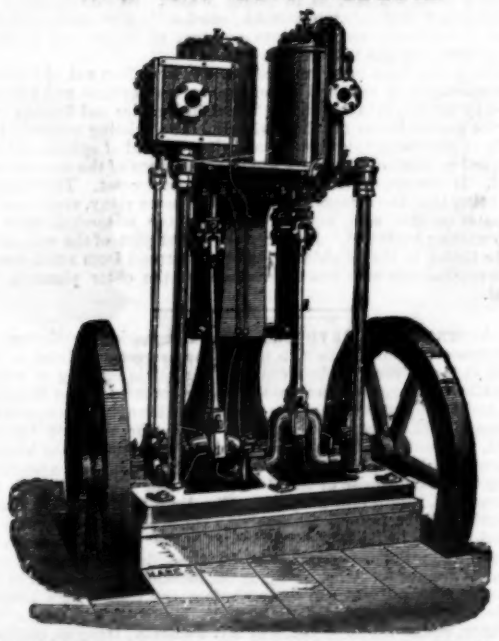

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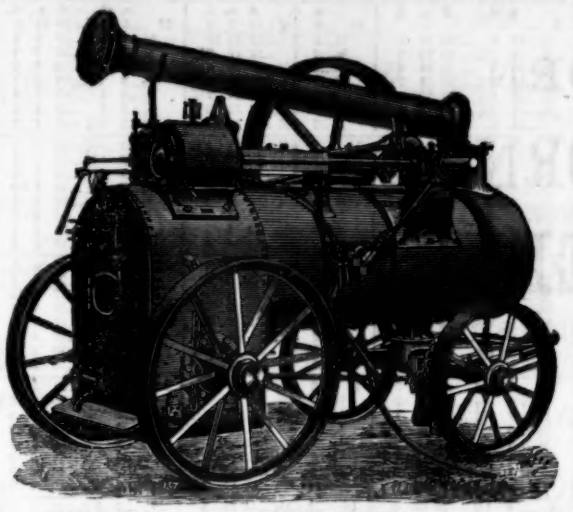

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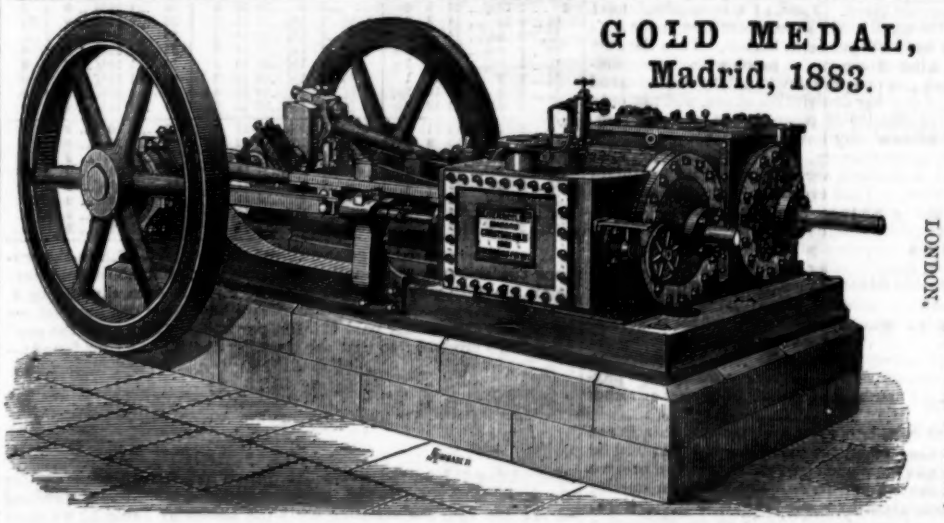

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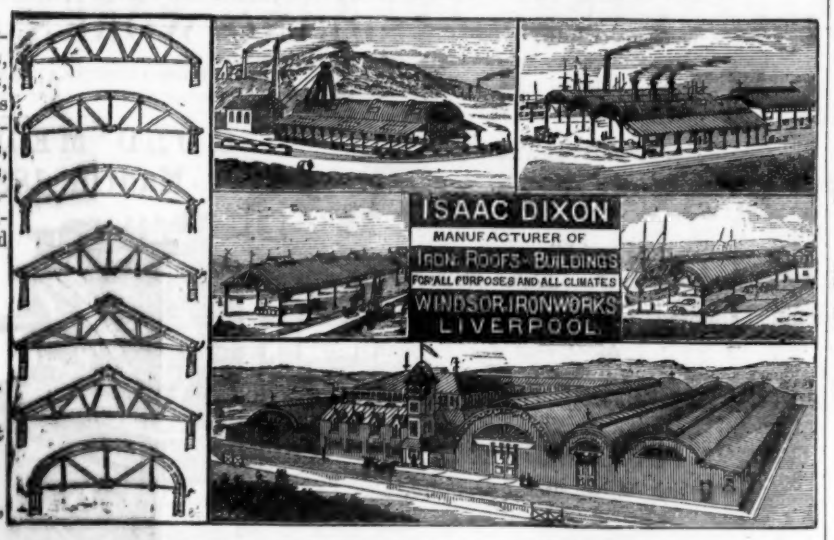


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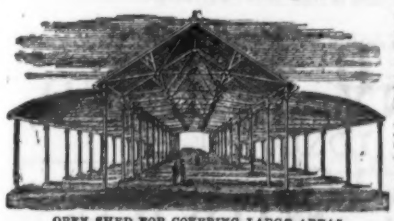

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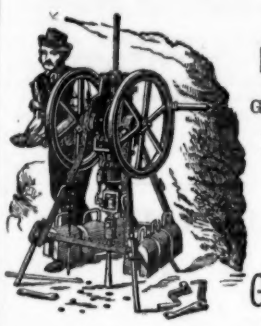

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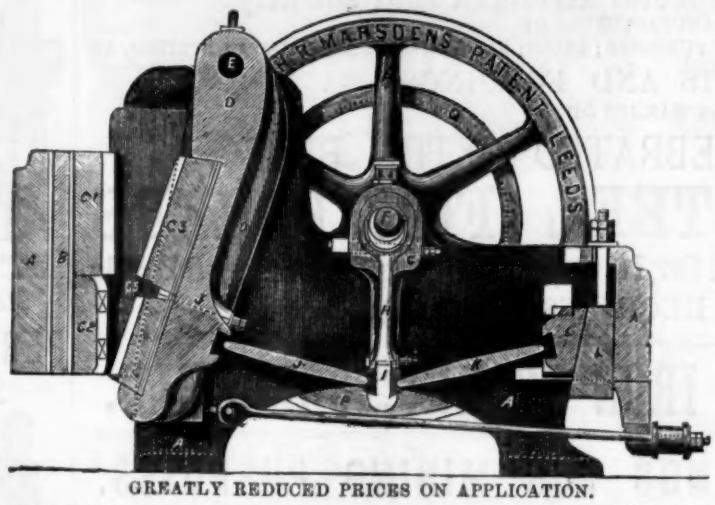


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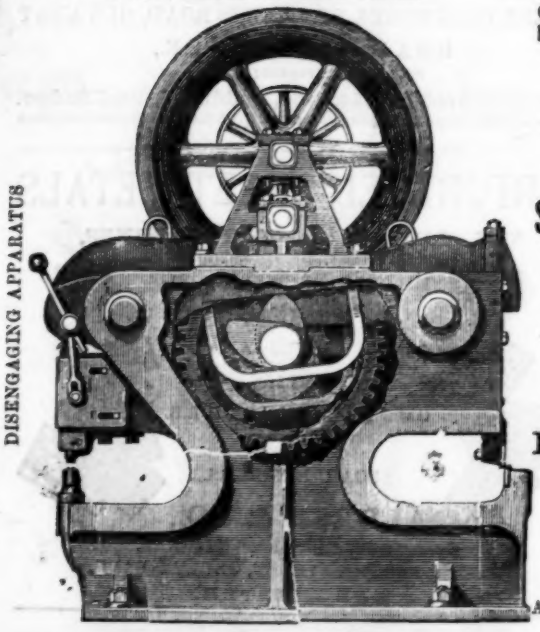


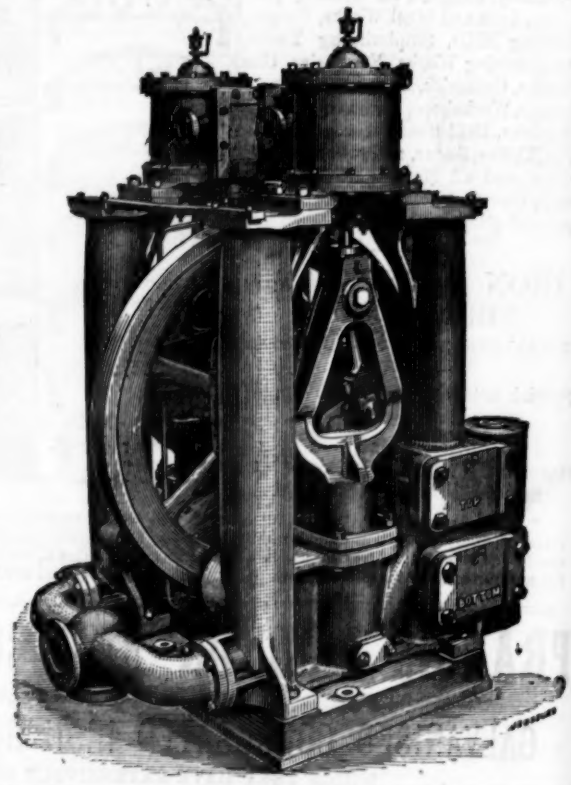

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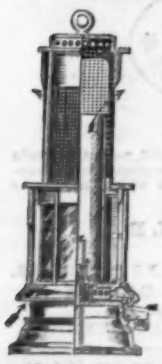

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